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JUNE 15, 1998 VOLUME 15, NUMBER 24

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

NET ASSOCIATES
strikes again
CEO Bill Larson is back on the acquisition trail.
[illegible]

1998 NetworkWorld SERVICE & SUPPORT SURVEY

Measuring SATISFACTION

Readers rate their vendors on service and support, and only three make the Honor Roll.

It's never fun to call a vendor for technical support, but which firm makes the experience as painless and productive as possible?

We polled 646 buyers of internetwork hardware, servers and groupware and asked them to evaluate their primary vendors on more than a dozen service and support attributes. The results, reported in the inaugural Network World Service and Support Survey, show buyers are generally satisfied, but there's room for improvement. Only three vendors scored 85 or better to earn a spot on the Network World Honor Roll.

Turn to page 49 to see how your vendors fared.

E-mail overload drives many users bananas

By Paul McNamara

Try to imagine your e-mail in-box accumulating 300 to 600 messages . . . not while you are away on vacation, but every day.

This nightmare scenario is already a reality for beleaguered power users and could become the norm for many more end users as person-to-person e-mail, subscriber lists and spam continue to proliferate, experts say.

"Anytime you see a small group [of users] experiencing a phenomenon, you immediately ask whether they are leaders or just strange," said Dave Crocker, a principal with Brandenburg Consulting in Sunnyvale, Calif. In this case the mega-mail recipients are clearly leaders whose experiences portend a challenge for other end users, as well as for e-mail administrators, Crocker said.

Recipients who get 100 to 200 messages per day are already common and no one

See **In-box**, *page 82*

Feds fumble phone fund

Fees passed along to corporate users have been an issue.

By David Rohde
Washington, D.C.

Government officials threw the nation's decades-old system of universal telephone service into turmoil last week, a situation that could have a big impact on corporate users' phone bills.

Can you get around paying universal service fees? Page 80.

Get more online

- FCC statements and documents related to universal access
- Articles on the controversy between FCC commissioners and carriers about passing the cost on to users

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The Federal Communications Commission, under a withering tide of criticism from Capitol Hill, was scheduled at press time to decide whether to scale back an ambitious program, E-rate, that promises to provide Internet access to the nation's classrooms.

The E-rate program has the potential to add $2.25 billion per year to the nation's phone bill for universal service. E-rate is part of the universal service program, which originally subsidized ordinary telephone lines in rural and other high-cost areas.

The E-rate program has resulted in a wave of new surcharges by carriers — first on corporate users' voice and data services and now increasingly on residential phone bills.

See **Universal**, *page 80*

IBM plans network product blowout

By Marc Songini
Research Triangle Park, N.C.

IBM's network business may be down, but it has no intentions of staying out.

In a wide-ranging interview with *Network World* editors, IBM Networking Hardware Division (NHD) executives said the company will introduce a new router, Internet servers, bundled applications and service provider packages this year.

The IBM moves are designed to put some products behind NHD's recent reorganization rhetoric (*NW,* April 27, page 1). NHD is trying to recharge its sagging network business by rolling out new Ethernet and TCP/IP products, as well as making the division a serious supplier to telco and ISP vendors.

"The key for IBM is execution," said Frank Dzubeck, president of the Washington, D.C.-based consultancy Communications Network Architects.

IBM can build cost-effective products from scratch from the chips up — unlike its competitors. "If IBM can take advantage of that it can be successful," Dzubeck added.

Last week, IBM rolled out the first fruits of its new plan: a low-end, low-cost family of Ethernet hubs and switches. For example, IBM announced an 8/16-

See **IBM**, *page 84*

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STEVE BORNS

Q&A Haile on the hot seat

- **Don Haile, vice president of development for IBM's Networking Hardware Division, addresses some controversial NHD issues in a recent Q&A session with *Network World* editors. Page 84.**
- **In other news, IBM's Global Services division is enhancing its remote and Internet access services. Page 83.**

Vendors' DSL tests don't go far enough

By Tim Greene
Atlanta

Smarting from criticism over a lack of compatibility, digital subscriber line (DSL) vendors are now pushing for interoperability among their superfast modems.

Unfortunately, the efforts of the vendors are helter-skelter, with each vendor handpicking the companies it will work with.

DSL vendors last week took advantage of Supercomm '98 to announce their interoperability plans — schemes that may be more for show than substance. "These announcements are part

See **DSL**, *page 82*

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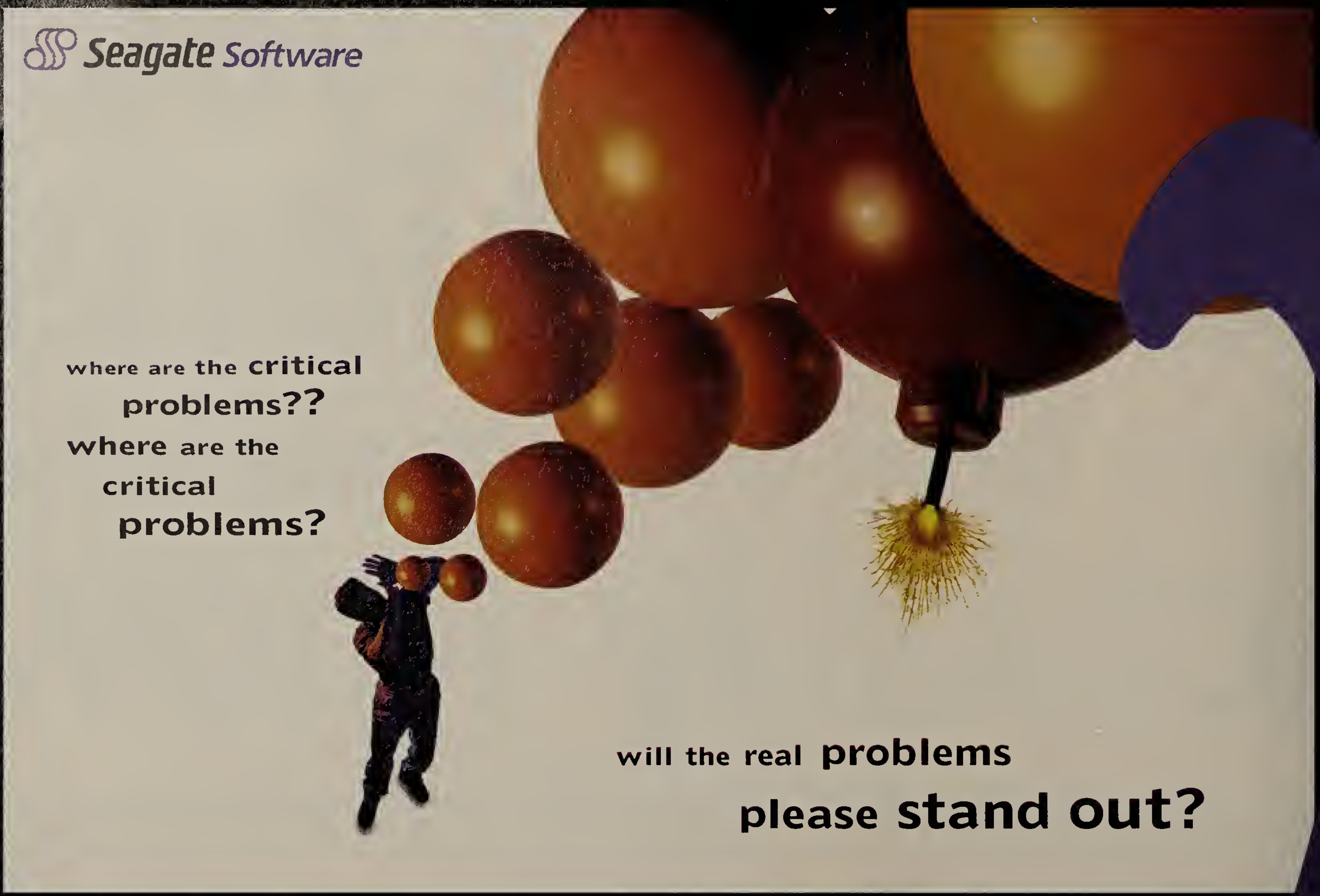
COMPAQ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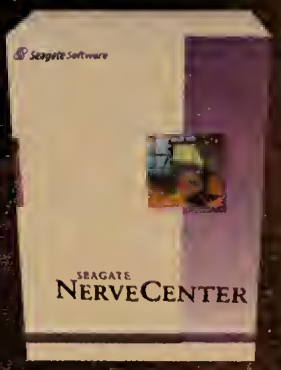

FIRST-CLASS WEB SITE

American Airlines' John Samuel says the company has pumped $1 million into a dynamic Web site redesign. Page 39.

STELLA JOHNSON

ADDING ATM OOMPH

Xylan is bolstering its OmniSwitch with ATM hardware, plus a software upgrade. Page 17.

E-COMMERCE ENERGY

E-commerce professionals such as FedEx's Mike Janes are exploiting online business-to-business tools. Page 42.

PHILLIP PARKER

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Electronic commerce

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SERVER TEST SERIES: *Micron takes the price/performance prize, but Dell picks up a World Class award in this group of six workgroup models, all powered by dual Pentium IIs.* **Page 61.**

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To quickly get to any online info referenced in *Network World*, enter its DocFinder number in the input box on the home page.

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This Week

Only on Fusion

Y2K. How big an issue is it for your network and network devices – and what are you doing about it? We've set up a forum to discuss the Year 2000 issue. **DocFinder: 7542**

On the job. Does your staff talk to each other about salary and job offers they get – even internal offers? If so, how does that affect your salary negotiations and ability to hold on to workers? See how other network managers are dealing with this and add your comments to our forum. **DocFinder: 7543**

Keeping Current. Fred McClimans says two big Bills (Gates and Clinton) are missing the boat when it comes to increasing the technical awareness of today's students (and tomorrow's workers). Battle to the death with telecom carriers over the E-rate, anyone? **DocFinder: 7544**

Certification. "Wired Windows" columnist Dave Kearns questions the value of some vendor certification programs. What do you think? Jump into our certification forum and let us know. **DocFinder: 7545**

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The Software Minute

Extending your enterprise in a connected world.

New technology speeds move from "show & tell" sites to real e-business. The new IBM WebSphere™ Application Server makes it easier to develop high-performance, database-oriented Web applications. It combines a runtime environment for Java™ servlets with connectors to common database formats, industry-standard object request brokers and enterprise middleware. Runs on http servers from Netscape, Microsoft,® Apache Server and Lotus® Domino Go Webserver.™ Download free code and info at www.software.ibm.com/min/appserver.

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The all-time hit record for a Web site: Nagano Olympic Games, February 20, 1998: 103,429 hits per minute – supported by IBM e-business technology now available in the WebSphere family.

FACT

News briefs, June 15, 1998

Lord Stanley never had this in mind

When it comes to hockey, no one would argue that Philip Lawlor or Doug Humphrey is a die-hard fan. But this year's Stanley Cup championship matchup between the Washington Capitals and Detroit Red Wings has inspired these respective CEOs of Apex Global Internet Services, Inc. (AGIS) and SkyCache, Inc. to put their money where their high-tech gear is. Dearborn, Mich.-based AGIS has said it will hand over one year's worth of high-speed, dedicated Internet access services and 20 AGIS coffee mugs and T-shirts to SkyCache if the Washington Capitals win the Cup. Laurel, Md.-based SkyCache said it will give up one year of high-speed satellite data service plus 20 SkyCache T-shirts and mugs to AGIS if the Red Wings win. The CEOs call this a "gentlemen's agreement," but everyone else is calling it a bet.

Cisco swallows poison pill

Cisco Systems, Inc.'s board of directors last week approved a shareholder rights plan designed to protect the network company's investors in the event of a hostile takeover bid. Known in the business world as a "poison pill," the plan is a strategic maneuver to make the company's stock less attractive to potential bidders. Cisco said it is not currently the target of a takeover bid but added that such moves are not uncommon among large corporations. The plan would kick in if a person or company acquires or announces an offer to acquire 15% or more of the company's common stock.

Dear Lou: Forget Microsoft

Consumer rights activist Ralph Nader wrote an open letter to IBM Chairman and CEO Louis Gerstner urging him to increase his company's support for the moribund OS/2 operating system and decrease IBM's support for Windows. In his letter, dated June 8, Nader expressed his surprise that IBM would not bundle OS/2 with IBM Aptiva computers. "Millions of OS/2 users are bitterly disappointed at IBM's failure to promote and improve the OS/2 platform . . . ," Nader said. He requested that IBM "stop forcing customers who buy IBM personal computers to purchase Microsoft Windows." At the very least, urged Nader, IBM should mimic Netscape Communications Corp.'s example and release the source code for OS/2.

Lotus delays Domino, Notes products

Versions 5.0 of Lotus Development Corp.'s flagship Notes and Domino products will not reach open beta until July, a month later than previously announced, the company told reporters last week. However, Lotus executives insisted the upgrades will still ship as planned before the year is out. The Notes 5.0 messaging and collaboration client is being designed to perform much like a Web browser, with forward and backward navigation buttons, bookmarks and native support for both rendering and creating HTML.

Solaris security scare

Internet Security Systems, Inc., in collaboration with Sun Microsystems, Inc., has discovered a security vulnerability in Sun's Solaris operating system that involves buffer-overflow problems in some versions of its Network Information Service+ (NIS+). Depending on the configuration of its NIS+ server, a remote intruder can gain root access to a vulnerable system or cause the NIS+ server to crash. Sun has provided a patch for the problem that is available at ftp://ftp.cert.org/pub/certbulletins/VB-97.03, the directory that ships with Solaris.

Compaq airs post-merger plan

By Tim Greene

With the way cleared to buy Digital Equipment Corp., Compaq Computer Corp. last week laid out plans to use Digital's impressive service force to shore up Compaq's traditionally weak customer support.

After Digital shareholders approved the $9.1 billion deal, Compaq CEO Eckhard Pfeiffer said his company also planned to do the following:

- Rally around Digital Unix and migrate away from other Unix flavors Compaq currently supports, including those from The Santa Cruz Operation, Inc. and Tandem Computers, Inc.
- Use the Digital Alpha chip in its high-end 64-bit servers rather than wait for the Merced chip being developed by Intel Corp.
- Lay off 2,000 of its own employees, in addition to the 15,000 the company announced it would cut from Digital.

In setting direction for the post-merger Compaq, the company said it wants to be No. 1 in industry services. "They have had a fairly weak service component, and this acquisition is heavily weighted in that direction. I think they bought Digital more for its service force than anything else," said Virginia Brooks, an analyst with Aberdeen Group, Inc. in Boston.

Compaq said it has the numbers to back up its fighting service words. The company now has 25,000 service professionals in 114 countries, including 3,000 Unix specialists, 2,000 Microsoft engineers and 12,000 Microsoft professionals. Compaq will have three key areas of focus: network and systems integration, operations management, and support and availability.

Toward the goal of network and systems integration, Compaq will set up an outsourcing program for customers called Future Sourcing, with projections for that business to grow 30% per year. In addition, Compaq this week will introduce Active Answers, hardware/software packages designed to solve common enterprise networking problems. A library of Active Answer packages will be available to customers via a Compaq extranet.

While it wants to build closer ties to customers, Compaq said it also wants to build closer ties between Unix and NT. The company plans to do that with middleware that will let the two talk to each other, and with the development of an "NT-friendly Unix."

Compaq wants to make NT friendlier to enterprise managers. The company said it will pull pieces from some operating systems Compaq has inherited, such as Open VMS, and move them into NT to make the Microsoft Corp. operating system more suitable for running an enterprise. "NT doesn't have full-blown enterprise capability yet. I think they are trying to address that," Brooks said.

Beyond announcing product directions, the company set five business goals: be No. 1 in customer satisfaction; give channel partners the ability to deliver broader services; attract the best talent; expand Compaq's share of messaging and other high-growth markets, including NT and ISP sales; and become a $50 billion IT service provider by 2000. Compaq also wants to be No. 1 in primary and secondary network storage and plans to give a higher percentage of its research and development resources to storage than to other areas.

Compaq also added a little dazzle to its image with a new logo.

The Digital deal, in the works since January, closed last Thursday after Digital shareholders voted in favor of it.

The combined company will maintain three campuses: Cupertino, Calif. for high-end Tandem gear, Houston for midrange Compaq hardware, and Maynard, Mass. for its worldwide service center.

Digital CEO, Chairman and President Robert Palmer announced his resignation one day before the vote. Palmer reportedly received a severance package of $6 million. ■

Palmer splits the scene

The merger of Compaq and Digital was approved by shareholders last week. A day before the vote, it was announced that the Digital CEO would not play a role at Compaq.

Be a NET KNOW-IT-ALL

For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2349 in the DocFinder box.

GET THE ANSWER Now!

This week's question:

Which company is using the code name "Platinum" for its next e-mail product release?

Feds buck own crypto policies

Ellen Messmer
Washington, D.C.

The federal government has long been dictating encryption standards that agencies, and sometimes corporations, must use.

But according to critics, many agencies of the U.S. government are failing to follow these basic crypto guidelines. Some simply ignore government digital signature and key-recovery mandates, critics charge. Others seek permission to avoid the guidelines.

To get around using a particular encryption standard, an agency has to write up a study to convince its own chief information officer (CIO) to grant a waiver, an act that could create a backlash from the White House or Congress.

For instance, the Social Security Administration (SSA) last week went public with its wish not to have to buy products conforming to the Digital Signature Standard (DSS), officially known as Federal Information Processing Standard (FIPS) 186. SSA CIO John Dyer argued that "compliance with the FIPS would adversely affect the accomplishment of the mission of the SSA," and that it was hard to find commercial products with DSS.

RSA's Bidzos *stirs the encryption pot.*

The SSA became the third agency to give itself a waiver for DSS. The Department of Agriculture and the Environmental Protection Agency have already done the same. This has all been cause for rejoicing at RSA Data Security, Inc., whose encryption technology is widely used for digital signing in products such as Lotus Notes. Most RSA-based products do not support FIPS 186.

With some glee, RSA's president Jim Bidzos last week set out to expose agencies that continue to use and buy RSA-based products without getting an official waiver. This long list not only includes the General Services Administration and the Veterans Administration, but agencies such as the National Security Agency, Federal Bureau of Investigation and the Central Intelligence Agency, which were the main backers of DSS in the first place.

Others violating federal procurement rules include the National Library of Medicine, NASA, the U.S. Postal Service and the Executive Office of the President, critics charge.

Key recovery — also known as key escrow in some circles — was also raked over the coals last week.

The White House has directed agencies to buy software products that will give law enforcement a way to look at the plain text of the user's encrypted data without the user knowing. The software industry is strongly opposed to mandatory key escrow because it will involve a mammoth redesign of products.

A contingency of software executives, including Microsoft CEO Bill Gates, last week held a closed-doors meeting with U.S. Department of Justice head Janet Reno and FBI Director Louis Freeh on the matter. In addition, the Business Software Alliance, a software trade group, released a report detailing the high costs for corporations to adopt mandatory key-escrow systems (see graphic).

While nothing concrete seemed to come out of the meeting with the government officials, the software executives were able to air their frustrations.

"Having all of us deliver breakable encryption means there won't be privacy of medical and financial information," argued Gates. Corporations do want to manage their own key-recovery systems, but their demand is very different from what the government wants in terms of a back door. Customers want keys stored in their corporate directory.

The U.S. Department of Commerce, which approves products with encryption for export, also weighed in on the issue at a conference hosted by the Electronic Privacy Information Center held here last week.

The Department of Commerce's Bill Reinsch, undersecretary for export controls, said he planned to make his agency staff buy key-recovery systems — even though they really didn't want to. "A number of our licensing people said we don't need to buy key-recovery features — it's not viable," said Reinsch. But for the Department of Commerce, which has been in the center of the key-escrow debate due to its role in reviewing vendors' product plans, it would be politically embarrassing not to use key recovery, Reinsch admitted. ■

The key costs of escrow

A government-imposed scheme for the "escrowing" of keys with approved third-party services would carry the following costs:

- ☑ $7.7 billion per year and $38.5 billion over five years as corporations and consumers that use encryption buy new software.
- ☑ Three million businesses would spend a combined total of $112 million each year just choosing a government-approved key-escrow agent to hold their encryption keys and would pay another $4.2 billion to set up and maintain agreements with service providers.

RBOC builds long-distance net

By Tim Greene
New York

Bell Atlantic is forging ahead with building a new long-distance network, even though federal regulations currently forbid the company from selling long-haul services over it.

The company last week said it will spend $200 million over the next four years to install ATM and Synchronous Optical Network (SONET) hardware for the network, which will support services in Boston, New York, Philadelphia and Washington, D.C.

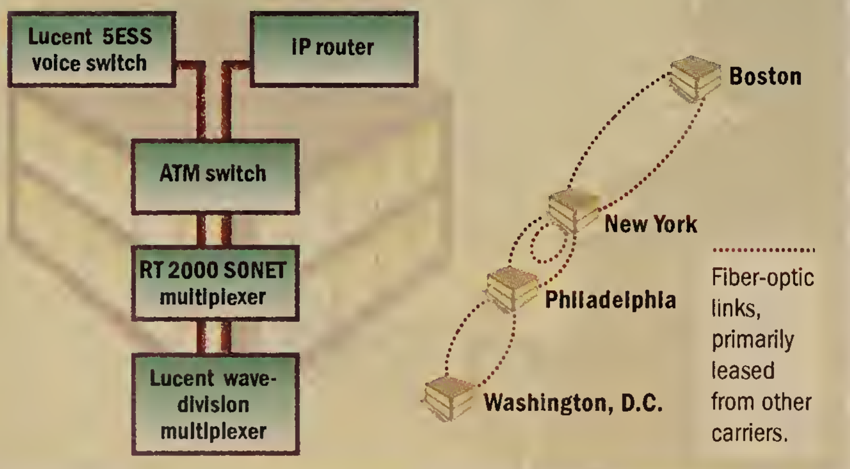
If the carrier is allowed to go ahead with its service plans, Bell Atlantic's cost for delivering long distance could be much less than that of its competitors, according to Robert Rosenberg, president of Insight Research Corp., a Parsippany, N.J., telecommunications market research firm.

About one-third of long-distance costs come from an access fee long-distance carriers pay to local phone companies for completing calls. If Bell Atlantic ran its own long-haul operation, the company would not have to pay those fees.

William Homa, network manager for supermarket chain Hannaford Bros. Co. in Scarborough, Maine, said he hopes Bell Atlantic's long-haul ATM prices would be low enough for Hannaford to afford extending its ATM network to stores outside of Maine. ■

BELL ATLANTIC STARTS ITS LONG-DISTANCE DRIVE

The RBOC plans to spend about $200 million on the first phase of its voice and data long-distance network. Here's how the net will be designed:


Lucent 5ESS voice switch
IP router
ATM switch
RT 2000 SONET multiplexer
Lucent wave-division multiplexer
Boston
New York
Philadelphia
Washington, D.C.
Fiber-optic links, primarily leased from other carriers.

Cabletron buys its way into xDSL

Company acquires two firms for $58 million.

By Jim Duffy
Rochester, N.H.

Cabletron Systems, Inc. last week entered the broadband remote access market by announcing it would acquire FlowPoint Corp. and Ariel Corp.'s Communications Systems Group for a combined sum of $58.5 million.

Ariel develops end-to-end asymmetric digital subscriber line (ADSL)-to-ATM systems, which give PC users high-speed access to the Internet, corporate intranets and online services. Ariel's Horizon II is a carrier-class xDSL Access Multiplexer for high-density DSL central office concentration.

FlowPoint makes customer premise xDSL and ISDN Internet and intranet access routers for businesses and home offices.

With the acquisitions, Cabletron is attempting to tap a market that is expected to grow from $95 million in 1998 to $1.6 billion by 2001, according to International Data Corp. in Framingham, Mass. The market is being fueled by customer demand for bandwidth to accommodate Internet-powered applications such as those for electronic commerce, distance learning, graphics-heavy Web sites, telecommuting, telemedicine, and integrated voice, video and data services.

DSL can support bandwidths up to 8M bit/sec using the existing telephone infrastructure and can offload data transmission from the public switched telephone network, according to Cabletron.

Cabletron competitors Bay Networks, Inc., Cisco Systems, Inc. and 3Com Corp. are aggressively moving into the DSL market as well. Cisco recently announced eight new DSL products for customer premises and service providers that leverage the company's acquisition of NetSpeed, Inc. Cisco also acquired the Dagaz unit of Integrated Network Corp. for international DSL requirements but has yet to show a product from that purchase.

Bay resells Paradyne Corp.'s HotWire rate-adaptive DSL, high-bit-rate DSL and symmetric DSL products for the customer premises and central office. And 3Com offers DSL modems and concentrators for Ethernet and ATM networks.

Under terms of the agreements, Cabletron will acquire FlowPoint for $25 million in cash or stock. Cabletron will acquire Ariel's Communications Systems Group for $33.5 million in cash. ■

Microsoft creates mini-industry for terminals

By John Cox
New York

Microsoft Corp. this week will release its Windows terminal software at PC Expo here, and in the process launch a mini-industry supported by an array of terminal, server, applications and utilities vendors.

Microsoft is also expected to reveal the price of its long-awaited NT 4.0 Terminal Server Edition (TSE). According to several sources, Microsoft plans to charge $1,129 for a 10-user TSE server license. Customers must also buy a standard NT Workstation 4.0 license and a Client Access License for each device accessing the server, which together would add up to about $200 per client.

Experts believe most users will also want to add MetaFrame software from Microsoft partner Citrix Systems, Inc. MetaFrame clusters servers, boosts WAN performance, and supplies administration tools. Sources expect Citrix to charge $4,995 for MetaFrame.

Larger users probably won't be deterred by Microsoft's pricing. But smaller customers may find TSE's price painful if they're using Citrix's WinFrame, which comes with a concurrent-user, rather than Microsoft's per-user, license.

"My large customers just blink and say, 'So what?' " said Bill Botti, president of Computer Networks, Inc., a Pleasanton, Calif., systems integrator and WinFrame reseller. "The little guys are totally up in arms because it costs more than Citrix's concurrent-user pricing," Botti said. "But if you have to run NT 4.0 applications, you just have to bite the bullet and pay Microsoft."

Terminal leader *pushes new Wyse choice.*

At PC Expo, terminal stalwarts will be showcasing the new generation of Windows-based terminals, which run a stripped-down version of the Windows CE operating system and use Microsoft's Remote Desktop Protocol to access applications running on the TSE server.

Wyse Technology, for example, will unveil the Winterm 3000 line, with variously sized color monitors, ranging in price from $799 to $1,289. Boundless Technologies, Inc., Network Computing Devices, Inc. and Tektronix, Inc. will show similar devices, most of which will also support Citrix's Independent Computing Architecture protocol, which offers better performance in WAN settings.

Motorola Corp. will unveil a reference design for a mobile Windows terminal. Computer builders will be able to license the design to speed development of this class of device.

These and an array of other vendors will be showing their wares at the Microsoft Partners Pavillion at the Jacob Javits Convention Center.■

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Net Associates CEO continues to reinvent firm

Network Associates, Inc.'s plan to buy antivirus software rival Dr. Solomon's Group plc for about $640 million represents just the latest in a string of acquisitions by the aggressive software company, itself the product of a blockbuster merger consummated in December between McAfee Associates and Network General Corp.

Network Associates Chairman and CEO Bill Larson last week spoke with *Network World* Senior Editor Andy Eddy about the thinking behind the company's acquisition binge and product strategy.

What's going on with all these acquisitions?

What we did this year in restructuring the company is use our balance sheet to acquire great products and engineering teams that enable us to have the broadest range of best-of-breed products, and [redefine] the minimum requirements of what it takes to do business in the network-security market.

In light of the handful of acquisitions Network Associates has announced this year, how would you describe the company's focus?

It's security and management. We intend to be leader in distributed systems management as the market shifts from enterprise operating environments being predominantly Unix to Windows NT. We're going to ride the Windows NT wave in to the enterprise, leveraging the fact that NT has vulnerabilities or limited capabilities in security and in its manageability.

What's your strategy for competing against the likes of Computer Associates International, Inc. and Tivoli Systems, Inc.?

With this latest transaction, we've increased our installed base by 20% to 25%, to well in excess of 50 million desktops. We have a great opportunity to use our Virus Scan and Dr. Solomon's Anti-Virus Toolkit installed bases on the desktop to embed agent technology for software distribution, authentication, sniffing and network-performance monitoring and have these agents link back to our Net Tools console.

The high ground is, he who owns the desktop will own the next generation of systems management. [CA and Tivoli] are really server-to-server companies.

The characters in Network Associates' "Who's Watching Your Network" series of print and TV ads have been somewhat striking: a pierced and tattooed "cracker" and a disgruntled janitor, among them. How does this ad campaign speak to the company's attitude?

We're a young, aggressive company out to change the paradigm, and we're changing the economics regarding minimum product requirements needed to compete in this market.

Clearly you've seen companies like Check Point [Software Technologies, Ltd.] and Security Dynamics [Technologies, Inc.] face issues. Check Point only grew 4% sequentially on a $30 million revenue base, while we grew 9% on $188 million.

The reason for that is we've delayed [customer] purchases of Check Point firewalls because we're offering a superior-value proposition in total network security.

For the price of a Check Point firewall, I'll give you certificate authority and encryption [technology too].

Our firewall is the one used by the CIA, and the package includes three kinds of intrusion detection.

You'll see a lot of people imitating our ads over the next couple of years. ■

Net Associates calls on Dr. Solomon's in $640m deal

By Nancy Weil

Santa Clara, Calif.

Network Associates, Inc. last week announced plans to buy rival antivirus software vendor Dr. Solomon's Group plc for about $640 million, a move that further consolidates the number of competitors in the network security market.

Mergers and acquisitions have drastically changed the face of the security market over the past year, and Network Associates has been leading the way. The company, itself the product of a blockbuster merger between McAfee Associates and Network General Corp. late last year, has already announced a handful of acquisitions this year, mostly involving security product companies (see graphic).

Network Associates officials said the company is stockpiling security software companies to offer customers more complete product packages at aggressive prices.

Soon after this latest acquisition is complete, Dr. Solomon's Anti-Virus Toolkit will be available with Network Associates' enterprise security suites, the Total Virus Defense Suite and Net Tools Secure.

"We won't be talking in a year from now about the antivirus market or the encryption market or the firewall markets," said Bill Larson, chairman and CEO for Network Associates, which posted revenue of more than $600 million last year. Increasingly, integrated security software packages will be offered, he said.

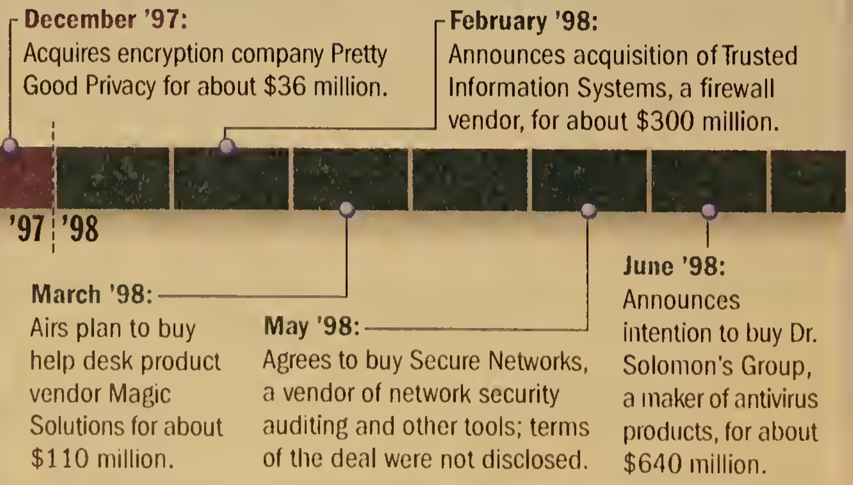
One analyst said the acquisition should benefit users.

"A lot of IS managers deploy more than one antivirus package," said Jim Balderston, an industry analyst at Zona Research, Inc. in Redwood City, Calif. "If an anti-virus package is just a database of known pathogens, you'll feel more secure if you have two databases that'll provide overlapping coverage."

Weil is a correspondent for IDG News Service's Boston bureau. Network World *Senior Editor Andy Eddy contributed to this article.*

Acquisition action

Network Associates was formed in December as a result of a $1.3 billion merger between Network General and McAfee Associates. Since then, Network Associates has been on a spending spree.



December '97: Acquires encryption company Pretty Good Privacy for about $36 million.

February '98: Announces acquisition of Trusted Information Systems, a firewall vendor, for about $300 million.

March '98: Airs plan to buy help desk product vendor Magic Solutions for about $110 million.

May '98: Agrees to buy Secure Networks, a vendor of network security auditing and other tools; terms of the deal were not disclosed.

June '98: Announces intention to buy Dr. Solomon's Group, a maker of antivirus products, for about $640 million.

OpenRoute preps router add-ons

By Jim Duffy

Westboro, Mass.

OpenRoute Networks, Inc., known as Proteon, Inc. for the past 25 years, this week will unveil several modules for its remote access router.

The new options for OpenRoute's GTX 1000 router enable users to support an additional LAN, as well as a wider variety of WAN links, company officials said. The modules also open up new applications for the GTX 1000, such as tenant services, which involve locating routers in the basement of an office building to provide 'Net access and virtual private network (VPN) services to each tenant in that building.

With a legacy in token-ring network interface cards — hubs and routers when it was known as Proteon — OpenRoute is now focusing on remote and Internet access for small and mid-size companies.

The GTX 1000 base unit comes with an integral Ethernet port and three slots for WAN interfaces. The seven new modules for the GTX 1000 include: 10Base-T; 56K bit/sec modem; 56K/64K DSU/CSU; T-1/fractional T-1 DSU/CSU; E-1/fractional E-1 DSU/CSU; and ISDN U and S/T Basic Rate Interface cards with support for analog voice and fax. With the new modules, OpenRoute now claims it can offer a router that supports dual LAN and WAN interfaces for about $1,400, excluding software.

Cisco Systems, Inc., meanwhile, offers a dual LAN, single WAN router — the Cisco 1605 — for about $1,500.

"The dual Ethernet was one we were beating [OpenRoute] up on for awhile," said Marc Evans, chief technical officer at network integrator The Destek Networking Group, Inc. in Nashua, N.H. "From a firewalling or multitenant situation, it's a real win. Most other routers are much higher end pricewise."

OpenRoute also announced a new version of its routing software that will run on the GTX 1000. Release 3.2 includes support for Dynamic Host Configuration Protocol clients and servers, which lets users automate the assignment of IP addresses and subnet masks, OpenRoute said. Version 3.2 also supports the point-to-point protocol over frame relay, point-to-multipoint multicasting and dial-on-demand VPNs.

The base GTX 1000 costs $1,195. The modules are priced from $195 to $795. Software costs $49 to $799, depending on feature set.

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FTC sues, Intel stands firm

Feds claim Intel reneged on deals with Compaq, Digital and Intergraph.

By IDG News Service

As expected, the U.S. Federal Trade Commission (FTC) last week voted 3-1 to issue an antitrust complaint against Intel Corp., alleging that the chip giant withheld vital technology information from three competing vendors. The FTC also charged that Intel is using its monopoly power to "cement its dominance over the microprocessor market."

The commission is asking for a "notice of contemplated relief," which would prevent Intel from continuing to engage in the conduct described in the complaint.

The government agency's action boils down to the issue of access to information. When Digital Equipment Corp., Intergraph Corp. and Compaq Computer Corp. sought to enforce microprocessor patents they hold against Intel and other computer companies that buy Intel products, Intel retaliated by cutting off those three vendors from essential technical information. Intel also threatened to stop supplying the three companies with microprocessors, alleged William Baer, director of the FTC Bureau of Competition.

Intel promotes and markets its microprocessors by giving customers technical information before chips are released commercially. That way, PC makers can be ready to release new machines either at the same time that Intel releases new chips or soon thereafter. In return, Intel customers are subject to non-disclosure agreements.

JASON GROW

Intel's Barrett *said he disagrees "with the basic premise of the FTC's charge against us."*

The arrangement creates a mutually beneficial relationship between Intel and computer vendors, but Intel has reneged on these agreements as a form of retaliation against Digital, Intergraph and Compaq, the FTC alleged.

A lawsuit filed by workstation maker Intergraph, which alleged that Intel used coercive tactics to obtain free rights to Intergraph's microprocessor patents, is a key to the FTC case. In April, a federal judge granted a preliminary injunction, ordering Intel to provide advance product information and technical support to Intergraph. Intergraph contends that Intel used its control of non-disclosure information to coerce Intergraph into giving up patent licenses. Intel has appealed the injunction.

Intel has engaged in similar tactics with both Digital and Compaq, Baer said. "Intel sought to deliberately injure these three companies," he added.

With Digital, Intel demanded prototype information on Digital's Alpha chip technology and then "warned customers of Digital not to work with Digital," Baer said.

In April, the FTC approved Intel's acquisition of Digital's semiconductor business, settling a patent dispute between the firms. But the agency made the approval contingent on Digital licensing Alpha technology to FTC-approved chip makers.

Only when Digital settled its patent lawsuit with Intel did the chip maker agree to again provide technical information about Intel microprocessors, according to the FTC.

Intel fights on

Intel President and CEO Craig Barrett last week said he disagreed with the premise of the FTC antitrust complaint, and that Intel will appeal in the U.S "federal court system should the FTC conclude with an administrative finding against us.

"We disagree with the basic premise of the FTC's charge against us. We believe we have abided by all the laws," Barrett added.

The point of contention, Intel officials said, is whether Intel had the right to withhold intellectual property from companies that were suing it — namely Digital, Intergraph and Compaq. Intel officials have acknowledged that their company didn't share intellectual property during legal battles with those customers.

As Intel understands it, under U.S. law a company being sued over intellectual property can "assert its legal right to intellectual property rights" — or withhold intellectual property — as a defense against the attacker, Intel officials said.

Thus, through its complaint the FTC is trying to "assert a new legal theory which is not supported by [the] antitrust law of the U.S.," Barrett said.

Intel officials also questioned the overall validity of the antitrust case, given that Intel has continually lowered prices on its products and spurred the growth of the computer industry. ■

Cable & Wireless pipes up about MCI merger moves

By Denise Pappalardo

Cable & Wireless plc has declared it will not sit by quietly while MCI Communications Corp. negotiates with regulators to secure its $37 billion merger with WorldCom, Inc.

Cable & Wireless last week filed a complaint with the U.S. District Court for the District of Columbia. Cable & Wireless is seeking an injunction that would require MCI to comply with the agreement to sell part of its Internet business to Cable & Wireless for $625 million.

MCI's agreement with Cable & Wireless states that if MCI must sell off more of its Internet business to gain European Commission (EC) and Department of Justice approval of its merger with WorldCom, then Cable & Wireless gets first crack at buying that business.

The Cable & Wireless complaint caught MCI officials by surprise. "The terms of MCI's agreement with Cable & Wireless have not changed," an MCI spokesman said.

But it's easy to see why Cable & Wireless has concerns, observers said.

"MCI has a lot of balls in the air between its deal with WorldCom and its deal with Cable & Wireless," said Dan Taylor, managing director of telecommunications at Aberdeen Group, Inc., a Cambridge, Mass., consulting firm. "[MCI was] hoping that the deal with Cable & Wireless would get the regulators off [MCI's] back, but it hasn't worked. Cable & Wireless wants to be sure that if MCI is going to give up any other Internet assets, they will get first rights of refusal."

MCI last month agreed to sell part of its Internet business, which includes the carrier's 'Net backbone and all of its wholesale ISP customers, to Cable & Wireless. The deal was made in hopes that it would clear the way for WorldCom and MCI to merge.

But MCI's pre-emptive strike has not quelled regulatory reluctance to approve the deal. The EC late last week stated that the partial sale of MCI's Internet backbone to Cable & Wireless will not clear the way for the MCI/ WorldCom merger.

Still, this does not mean that additional simple compromises would not do the trick, said Willy Helin, a spokesman for the European Union Delegation of the EC in Washington, D.C.

The delegation wants to ensure that MCI will not try to lure back its wholesale ISP customers in a few years, Helin said.

The EC's concern may lead to a regulatory watchdog being assigned to oversee the divestiture of MCI's wholesale Internet business to ensure that a complete divestiture occurs, he said.

But industry watchers said MCI may have to give up more, such as its residential Internet access customers.

None of the parties involved would comment on the details of the negotiations with regulators.

The EC has stated that if WorldCom sold UUNET Technologies, Inc., the carrier's Internet darling, the MCI/ WorldCom merger would sail through the regulatory approval process. However, WorldCom doesn't consider this to be a serious option. ■

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Rakitin, Phone: (508) 820-7532

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Features Editor: *Paul Desmond,*
Phone: (508) 820-7419, Fax: (508) 820-1103
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REVIEWS
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INTRANET
Executive Editor: *Beth Schultz,*
Phone: (773) 283-0213, Fax: (773) 283-0214
Senior Editor: *Peggy Watt, Phone: (650) 903-9519,*
Fax: (650) 968-3459
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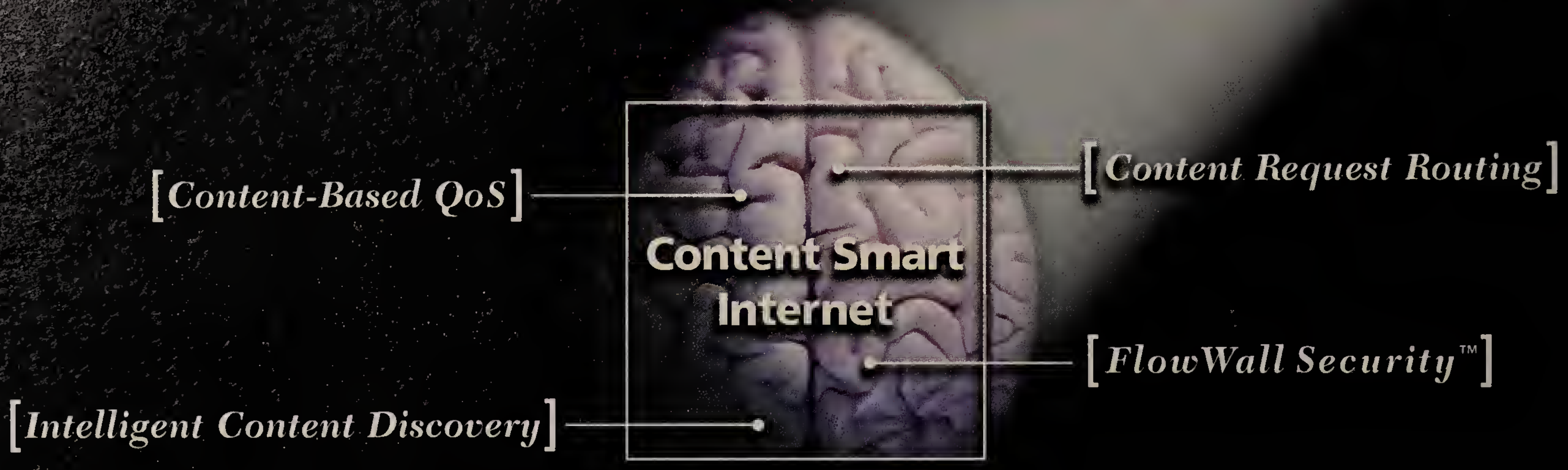

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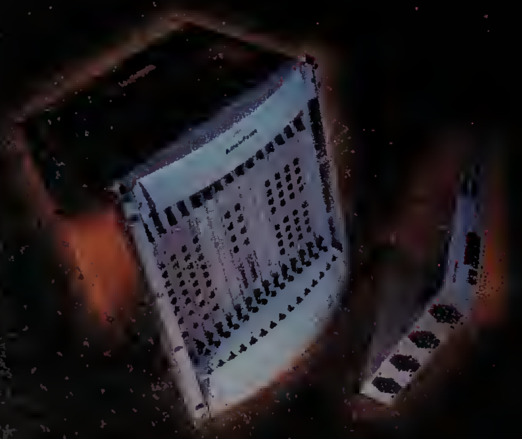

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Briefs

The Desktop Management Task Force (DMTF) *has officially taken over ownership of the WBEM initiative, an effort to establish Web-based management standards.*

WBEM standards will be developed across various DMTF working groups.

To access a list of frequently asked questions about the DMTF's role overseeing WBEM, visit the consortium's Web site at www.dmtf.org.

The WBEM effort was launched by BMC Software, Inc., Cisco Systems, Inc., Compaq Computer Corp., Intel Corp. and Microsoft Corp.

The DMTF, founded in 1992, is a consortium focused on establishing PC management standards.

✆ DMTF: (503) 225-0725

3Com Corp. *has disclosed plans for* **adding policy-based network technology** *across its product lines.*

In the third quarter, the company will add Lightweight Directory Access Protocol (LDAP) client support to its LAN switches.

This will enable the switches to access user-based network access and quality-of-service policies from any LDAP directory.

In the fourth quarter, 3Com will release a policy server and policy administration application; support for Netscape Communications Corp., Novell, Inc. and Siemens AG directories; and IEEE 802.1p software for non-3Com network interface cards.

In 1999, 3Com will support Microsoft Corp.'s Active Directory and unveil policy-based security, configuration and monitoring applications.

Xylan adds new software, ATM hardware for OmniSwitch

Company upgrades its switch OS to support tunneling and VLANs.

By Robin Schreier Hohman
Calabasas, Calif.

Xylan Corp. is beefing up its chassis-based OmniSwitch with new ATM cell switching modules, new software, and support for digital subscriber line, cable modem and other high-speed data network services.

The OmniSwitch is a multilayer switch that integrates LAN and ATM switching, WAN connectivity, virtual LANs, IP-based firewalls and high-speed routing. It has a cell ATM architecture and can switch ATM to the desktop, LAN and WAN.

The new products are designed to increase the switch's ability to handle voice and video, control bandwidth and increase quality of service (QoS).

Xylan is also looking to make a name for itself in the carrier equipment market with the addition of features that enable the OmniSwitch to work as a broadband access concentrator. Enabling the switch to serve as a concentrator is vital for handling high-speed connections.

A concentrator sits between a user's access equipment, such as a cable modem, and a carrier's network. It allows value-added services such as address management, multilayer switching and QoS.

Upgrading the OS

Version 3.2 of the Xylan Operating System (XOS) has several new additions, including:

- Virtual path tunneling, which lets a user build a private high-speed network across a public ATM service.
- Soft permanent virtual circuits, which allow a network manager to specify two devices that need to be connected, leaving the switch to configure the links in between.
- Authentication services, which increase network security by requiring users to enter an ID and password.
- Port mapping, which can segregate traffic into self-contained partitions, enabling scalability.
- 802.1Q Tagging Support, which allows for VLANs.

The Xylan CSM-U *combines voice and data.*

The new XOS software is shipping now with a list price of $1,250 and an upgrade price of $450. Licenses for Authentication Services software lists for $1,995 for one switch, $4,995 for five switches and $9,995 for an unlimited number of switches.

New modules

On the hardware side, Xylan has introduced the ASM2, which allows companies to extend LANs to an ATM backbone. The new ASM2 uplink module uses "traffic shaping" to specify sustained cell rates, peak cell rates and maximum burst size parameters for up to eight groups of users.

An OC-3 version is shipping now and is available for one or two ports of single-mode or multimode fiber. Xylan is planning to release an OC-12 module. The ASM2 lists for between $7,950 and $16,950.

The new CSM-U module is designed to combine voice and data networks and is shipping now. The OC-3c modules are available in two-port densities for copper, multimode, single-mode, long-reach lasers and single-mode, intermediate-reach lasers. There are also four-port modules for T-1, E-1, T-3 and E-3 connections. The CSM-U costs from $9,800 to $37,800.

✆ Xylan: (818) 880-3500

Get more online:
○ A look at Cabletron's move to ATM
○ Xylan financial and stock info
FIND IT ON FUSION 7531

Sun readying 64-bit version of Solaris

Merced chip's delay may prove to be a blessing for Sun, observers say.

By Marc Songini
Mountain View, Calif.

Sun Microsystems, Inc. is getting ready to roll out a 64-bit edition of its Solaris operating system that could enable customers to run mainframe-caliber applications on high-end servers.

In addition, Sun predicted that the replacement for its 32-bit operating system will appeal to customers looking to port applications to centralized servers from smaller distributed servers.

Sun *is prepping Solaris 2.7, a 64-bit version of the operating system.*

Sun plans to roll out the 64-bit Solaris 2.7 this fall for the company's SPARC-based servers, including the high-end Starfire Enterprise 10000. Sun also recently issued a beta edition of 64-bit Solaris to a host of server partners, including NCR Corp., that plan to deliver servers powered by Intel Corp.'s upcoming 64-bit Merced processor.

Sun claimed the new edition of Solaris will be well suited for running data warehouse applications, handling large graphics files and executing complex scientific simulations.

NT 5.0 challenger

The combination of 64-bit Solaris and Sun's 64-bit SPARC chip could prove attractive for customers who cannot afford to wait around for servers based on Intel's 64-bit Merced processor and Microsoft Corp.'s Windows NT 5.0. NT 5.0 won't ship until next year, and Intel now expects Merced to be delayed possibly until 2000.

"This will give Sun more time to work the bugs out," said Amir Ahari, an analyst with market research firm International Data Corp. in Framingham, Mass. "Sun must be loving this."

Users such as David Buckley of Nicholas Applegate Capital Management in San Diego, are looking forward to the Solaris upgrade for supporting data warehouse applications. End users will have "larger, more addressable space. It'll be faster, and things will load right into the memory," said Buckley, who is manager of Unix systems.

Customers who already own 32-bit Solaris machines will be comforted to know that the 64-bit Solaris architecture will be backward-compatible with existing 32-bit applications, according to Sun.

In other Solaris news, Sun also announced that it was offering a special version of the operating system for ISPs. Solaris for ISPs has management, monitoring and Java support. Sun claims it will allow ISPs to offer special high-end services for their customers. The price starts at $5,995.

✆ Sun: (800) 786-7638

Plaintree snags $6.2 million from Nortel

By Robin Schreier Hohman
Ontario

Colin Beaumont thinks Plaintree Systems, Inc. has so much promise, he's come out of retirement to head up the switching company. Once on board, Beaumont quickly convinced Nortel to buy a 19% equity stake in the company, which translates in to roughly $6.2 million in cash.

Beaumont retired two and a half years ago as chief engineer of Bell-Northern Research, Nortel's research and development subsidiary.

Beaumont's first plan of business is to increase sales, largely based upon Plaintree's core product, the WaveSwitch 9200, he said. The company will get an endorsement in that area because Nortel has licensed Plaintree's data switching technology as part of the deal. Both companies also agreed to develop high-capacity data switches for the carrier market.

Although Plaintree has won industry praise for its WaveSwitch 9200 Gigabit Ethernet backbone monster switch, the company is still losing money.

"With a small company like this, when your sales dip and you're really staffed up to move a new thing, you burn up cash very quickly," Beaumont said.

WaveSwitch 9200 *is key to Plaintree's future.*

In fiscal 1998, Plaintree had revenue of $16 million, with a net loss of $24 million. That was a steep decline from 1997, which saw revenue of $29 million with a net loss of $13 million.

That's one of the reasons Plaintree needs the clout of a high-powered company such as Nortel behind it.

For Nortel, Plaintree offers a cheap way in to the large backbone market. There has been speculation for months that Nortel might buy a Gigabit Ethernet switching vendor, to compete with Lucent Technologies, Inc.

Lucent recently paid $1 billion in cash to acquire Landover, Md.-based Yurie Systems, Inc., an ATM vendor. Before Lucent bought Yurie, Lucent was selling Yurie's switches under an OEM agreement.

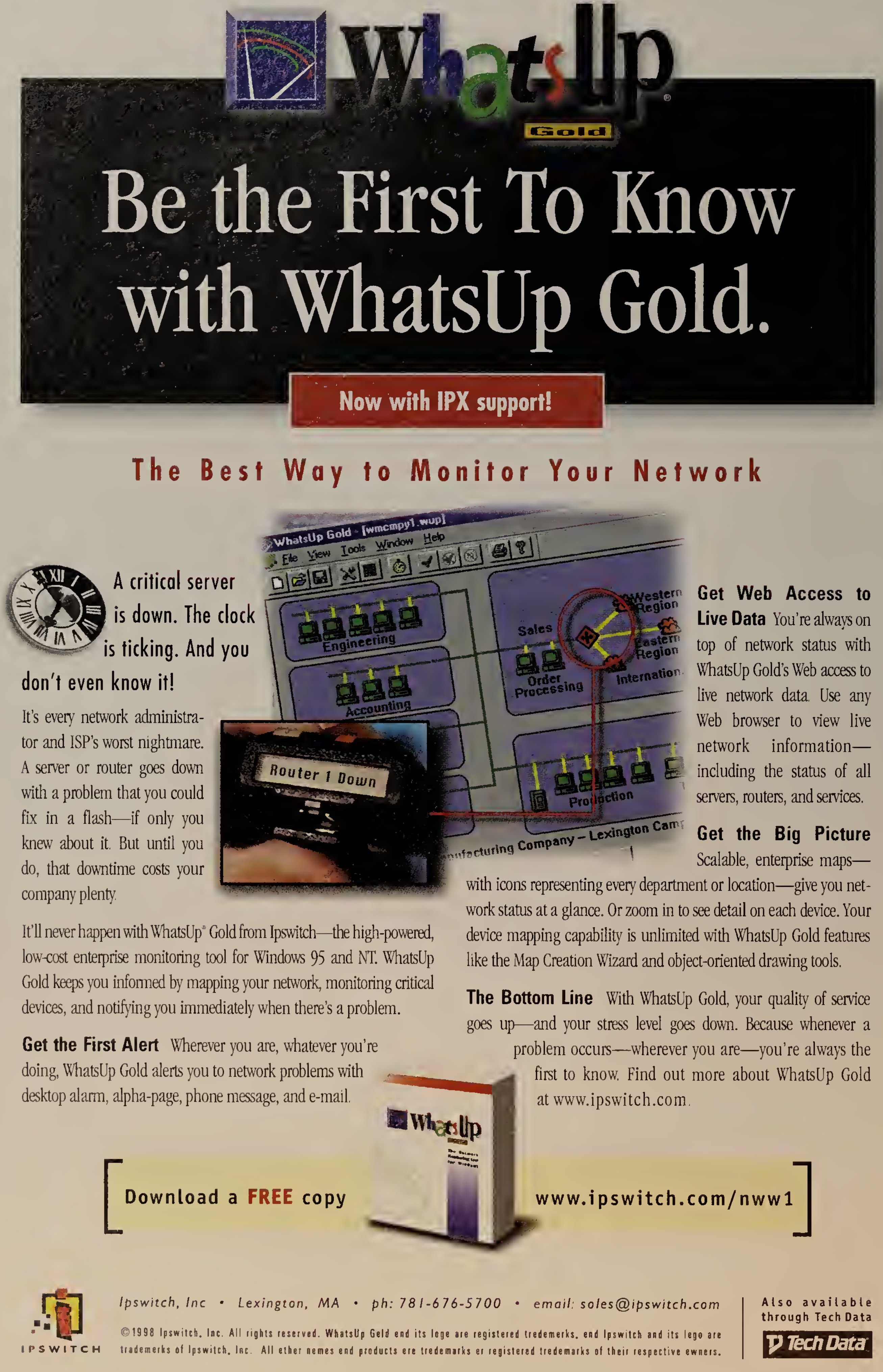
The WaveSwitch 9200, which was released in mid-1997, was one of the first Gigabit Ethernet switches to hit the market.

It's a very large, chassis-based backbone switch with a maximum switching capacity of 48 million packet/sec. It can support 32 Gigabit Ethernet ports, 64 FDDI SAS or 32 DAS ports, 128 10/100M bit/sec copper or fiber ports, or 384 Ethernet ports.

Plaintree is focusing on the switch's ability to seamlessly move in front of a router, without insisting you replace the router, redo subnets and reprogram IP addresses.

"You don't have to do anything to the routers; that's the key point to the whole thing," said Paul Weiss, vice president of marketing at Plaintree.

"We already know where the IP addresses are because we are essentially examining the Layer 3 headers of every packet that comes into the switch. We build our own tables and know where the paths to those things are," Weiss said. ■



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Contest opens April 27, 1998. To enter, visit www.3com.com/ethernetleader/nw, complete the on-line entry form and provide an essay in 500 words or less describing your most successful 3Com Ethernet network implementation. Entries must be received by May 22, 1998 at 11:59 PM ET. Entries become the property of Sponsor, and cannot be returned. Limit one entry per person. Winners will be notified by June 20, 1998. Open to legal residents of the 50 United States, and Canada (excluding Quebec), 21 years of age or older, except employees of 3Com, *Network World*, their immediate families, respective affiliates, subsidiaries, agents, advertising agencies and Marden-Kane, Inc. A panel of 3Com judges will select a group of finalists, with the final judging to be determined by Marden-Kane, Inc. All decisions are final and binding. Prizes consist of: One (1) Grand Prize of $10,000.00 in 3Com Ethernet equipment (not for resale) which will be awarded to the business indicated on entry form, and a $500.00 cash prize to author of the winning essay and Four (4) First Prizes of $250.00 in cash, for a total approximate retail value of $11,500.00. The author of each complete entry automatically receives a free 3Com 25th Anniversary of the Ethernet t-shirt. Void where prohibited or restricted by law. To obtain complete official rules, send a self-addressed stamped envelope before May 22, 1998 to: 3Com's Ethernet Business Solution Contest, PO Box 16216, Encino, CA 91416. Complete rules also appear on website address listed above.

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WIRED WINDOWS

Another Windows NT security hole

Well, well — there's another big flap about Windows NT and security. Counterpane Systems recently announced that it has discovered flaws in Microsoft's implementation of Point-to-Point Tunneling Protocol, which is used in many commercial virtual private networks (VPN). The flaws supposedly lead to password compromise, disclosure of private information and server inoperability in VPNs running under Windows NT and 95.

A look at the white paper — describing the problem (www.counterpane.com/pptp.pdf.zip) — shows that the major crux of the security problem is that old bugaboo: the weak encryption NT uses for backward compatibility with pre-NT (that is, LAN Manager) systems. I wrote about this last year (*NW,* Aug. 4, 1997, page 22), spotlighting L0phtCrack 1.5, an application used to break into NT servers. Not surprisingly, L0pht's chief spokesperson, the well-known hacker Mudge, is listed as co-author of the Counterpane study.

Now there are other deficiencies pointed out in the white paper, but it's the backward-compatible, weak authentication that gets the most play. But as Microsoft points out in its response (www.microsoft.com/communications/pptpfinal.htm), a fix for this — allowing you to turn off the LAN Manager authentication — was posted on Microsoft's Web site more than a year ago.

Dave Kearns

Another flaw noted, however, was that some installations of Windows 95 were unable to use the stronger NT authentication method and had to rely on the weak Lan Manager authentication. Neither Counterpane nor Microsoft was able to pinpoint for me a way to identify which Windows 95 installations could not use NT authentication. I did learn that all installations of Windows 98 will support strong authentication "out of the box." I just might revise my thinking on the business use of this new operating system, which appears to be targeted at the home entertainment market.

There's even better news to come late this year, or early next year, with the release of Windows NT 5. The default authentication method will be an implementation of MIT Version 5 Kerberos. While it will still be possible to turn on LAN Manager and NT authentication (again, for backward compatibility), in general, the L0pht will have to find another way to bash Microsoft and NT Server.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@ vquill.com.

Tip of the week

Like UnixWare and Novell DOS before it, NetWare for Macintosh will be spun-off to another company for future development and support. Later this month, it will be announced that Prosoft Engineering (www.prosofteng.com), best known for custom software, will acquire all of Novell's Macintosh products. It's rumored that the first new product will be an improved NetWare client for Macintosh, one including native TCP/IP support. The downside is that Macintosh connectivity will no longer be included in the NetWare "Red Box" but will have to be purchased separately.

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Internetworks

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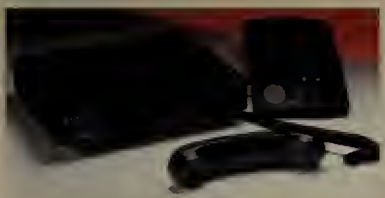
Briefs

■ **Cisco Systems, Inc.** *has unveiled a* **two-slot version of its 7200 series router** *to support services such as high-speed LAN interconnect, virtual private networking and Internet access. The Cisco 7202 can be used as an enterprise WAN gateway, and its quality-of-service (QoS) features can help manage WAN resources, Cisco said.*

The 7202 supports OC-3 ATM and T-3 WAN interfaces. It is available now at prices ranging from $16,250 to $18,600.

©Cisco: (408) 526-4000

■ **Teltrend, Inc.** *this week will release* **Network iQ,** *a three-member branch-office router family that integrates a firewall and encryption features. The iQ routers are suited for building virtual private networks over the Internet or frame relay networks. The iQ 800 and iQ 1000 are designed for branch offices, and the Network iQ 3000 is for large branch offices and headquarter sites. The boxes support IP, IPX and AppleTalk routing. They can link with ISDN, leased lines or frame relay connections. All models are available now. Base-model prices are $795 for the IQ 800, $1,395 for the iQ 1000 and $4,495 for the iQ 3000.*



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■ **IBM** *last week announced an* **Nways Manager for HP-UX** *Version 1.2 module that includes element manager and remote monitor (RMON) capabilities. The software lets users manage any IBM SNMP-capable device from any HP-UX workstation. The element manager and RMON software cost $9,995 and $8,000, respectively. Both packages will be available Aug. 28.*

©IBM: (800) 423-4968

HP: Three can play at this mgmt. game

By Jim Duffy
Seattle

Having ceded enterprise management mindshare to Computer Associates International, Inc. (CA) and Tivoli Systems, Inc., Hewlett-Packard Co. (HP) is determined to become a leader in the nascent IT service-management market.

At the recent OpenView Forum International user group conference, HP emphasized that it has solid products and implementation plans for deploying IT service management. IT service management is the practice of tying IT operations and resources to business objectives.

At the conference, HP announced a variety of improvements and future enhancements to its two key OpenView service management packages — IT/Operations, for measuring system availability, and IT/Administration, for change and configuration management (*NW*, June 8, page 6).

Software and services will account for 10% of HP's $50 billion annual revenue by 2000, says HP CEO Lew Platt.

KIM KULISH

But HP executives also used the meeting to remind users that the company is firmly committed to the OpenView platform and will continue to invest in it. HP has been restating support for OpenView since last summer, when a company executive resoundingly endorsed CA's Unicenter TNG as a "preferred" enterprise manager.

"We have the commitment all the way from the top to invest and grow the OpenView business," said Olivier Helleboid, general manager of HP's OpenView software division, as he replayed 3-month-old videos of HP CEO Lew Platt affirming the company's support for OpenView and for software in general. "I think the message is pretty clear, " Helleboid said.

The message was not so clear last summer. That's when Dick Watts, an executive in HP's server division, shared a dais with CA CEO Charles Wang, and delivered a firm endorsement of Unicenter and announced an agreement to bundle it with HP servers.

The deal led many industry observers to count OpenView out as a viable competitor to Unicenter and to Tivoli's TME 10 framework for enterprise management.

But enterprise management is evolving into IT service management, Helleboid said, so HP believes CA and Tivoli will have to catch up.

HP by no means has the IT service-management market cornered. Tivoli is getting ready to unveil a service-management roadmap using products from its acquisition of service-desk developer Software Artistry, Inc. (*NW*, May 11, page 1).

CA has service- and help-desk products that can easily be positioned as service-management offerings.

Helleboid believes HP's biggest advantage over CA and Tivoli is that OpenView allows users to build a service-management infrastructure incrementally.

HP has separate OpenView offerings for service definition, deployment and monitoring.

CA and Tivoli offer all-encompassing enterprise-management frameworks that take months — sometimes years — to implement, and cost hundreds of thousands of dollars. "We are clearly in the Big Three, and we feel very good about that," he said. ■

Get more online:

- A look at HP's recent management announcements
- Overviews of other vendors' service-level management software

7532

www.nwfusion.com

Tavve management tool targets Cisco nets

Performance monitoring module works with HP's OpenView, IBM/Tivoli's NetView mgmt. platforms.

By Marc Songini
Durham, N.C.

Tavve Software Co. this week will roll out software for tracking and predicting the performance of Cisco Systems, Inc. routers.

The company's new Performance Reporting Module for Cisco Networks, like Tavve's other applications, is designed to enhance broad management platforms such as IBM's NetView and Hewlett-Packard Co.'s OpenView.

The Performance Reporting Module is designed to give net administrators a quick read on how their Cisco devices are holding up, said Tim Clark, head of sales and marketing at Tavve. NetView and OpenView can prove unwieldy when it comes to getting information about specific devices in a hurry, he said.

Tavve's graphical user interface-based tool comes preconfigured to collect information about router performance, and displays the data in easy-to-read reports that can be distributed to designated staff members. Service-level and maintenance updates are among the reports that the software can generate.

The software also collects information on traffic levels to help net administrators forecast network performance.

In addition, administrators can use Tavve's software to define thresholds that will trigger alarms if a router's performance drops below the defined level. The software includes an event correlation engine that can help pinpoint the root cause of a problem.

Tavve's software "gives you a good, quick picture of the network performance without [having to rely too much on] using OpenView or NetView," said Robert Davies, senior technical specialist at United Guaranty Corp., a Greensboro, N.C., firm with a 750-seat network. He said the module should be particularly useful for monitoring the health of WAN links and because "without knowing Cisco code you can still get information."

The Performance Reporting Module for Cisco Networks starts at $4,995.

Down the road, Tavve plans to roll out new modules, including one for managing Bay Networks, Inc. devices.

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Headquarters: Durham, N.C.
President: Anthony Edwards
Financials: Privately owned
Employees: Six
Principal products: Network monitoring and performance tools

INTERNETWORKING MONITOR

Five steps to product nirvana

While the product set has changed dramatically since I first began testing internetworking gear in the 1980s, the goals of product designers seem to remain constant. From the earliest two-port bridges to the latest high-density Layer "X" switches, vendors largely follow an unwritten but consistent development course as products move through their life cycles.

Extrapolating from the hundreds of tests The Tolly Group has conducted over the years, I can identify at least three areas of "absolutes" that are targets for design engineers.

- Wire-speed throughput

Whether relevant to an actual customer environment or not, wire speed has long been the most fundamental engineering imperative for designers of bridges, routers and switches. Thus, implementing functions in silicon and optimizing software components are typically the first actions taken as a product begins its life cycle. As speeds increase — from 10M to 100M to 1000M bit/sec — the challenge to achieve wire-speed throughput is revisited.

- Infinite capacity

Once wire-speed performance is commonplace, it is time to raise the bar. The question then becomes one of load or capacity. If two devices boast wire-speed throughput, one that supports this load for 50 simultaneous data streams is better than one that can do that for only 25 data streams.

Thus, we see test beds growing larger and larger. Where tests of a few dozen ports were commonplace just a few years ago, today it is not uncommon to test configurations involving over one hundred switch ports. The ideal product, of course, can handle an infinite load.

Kevin Tolly

As with the engineering absolute of wire speed, the target of handling an infinite load typically serves engineering interests more than customer interests. Who designs, say, a 100-port switch to operate at full load on every port all the time?

- Maximum function

Once the practical limits of raw power have been reached, vendors turn to function. Early products achieved wire speed with virtually every value-add component — even essential ones such as spanning tree — shut off. Realizing that network managers need functions such as network management, high-density, wire-speed switch vendors have started to add back functionality. The critical aspect to note is that this added functionality does not degrade performance. Thus, you'll find testing that shows wire-speed performance both before and after resource-intensive functions such as RMON have been enabled.

Vendors need to do all of this and drive down the cost to build these devices until it is as close to zero as possible. Good value to the customer with good margins for the vendor makes everyone happy.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.

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Ironic, isn't it? That an inconvenience of Y2K's* immensity might actually do your network some good after all. But consider it this way: since there's no getting away from that major network upgrade, maybe there's something you can get out of it. For instance, here's what happens when you upgrade to Microsoft® Windows NT® Server 4.0:

Windows NT Server 4.0 delivers proven file/print performance. Using the industry-standard Netbench performance tool, Windows NT Server 4.0 outperforms Novell NetWare 4.11 by nearly 17% in file/print throughput tests.

Windows NT Server 4.0 unifies file/print and applications on one platform. It's the ideal choice for supporting key business applications, including groupware like Microsoft Exchange Server. There are already over 4,000 applications for Windows NT Server available today. And, of course, running your applications and file/print on a common platform simplifies the management of your network—giving you more time to focus on achieving your long-term goals.

Windows NT Server 4.0 is the easy way to prepare for the future. It's already the leading intranet platform—in fact, according to IntelliQuest, it's the platform that 56% of corporate Web applications are being built on. And with features like remote access services, virtual private networking and out-of-the-box integration with Microsoft Proxy Server, you can enable cost-effective, secure communication across the Internet among employees, customers and partners. It's an exceptional Web server too—according to NetCraft, more than half a million Internet sites are currently running on Windows NT Server.

Windows NT Server 4.0 reduces total cost of ownership. A recent study by the Business Research Group compared it to NetWare in a mixed environment, and revealed that, as a unified platform, Windows NT Server 4.0 lowers the costs of providing file/print sharing and application support by nearly 20%.

And if you upgrade now you'll save up to 20% off the estimated retail price.† You'll also qualify for a free Services for NetWare CD-ROM (ERP $149) that makes it easier for you to transition your NetWare-based network to Windows NT Server 4.0.

So the question is not: How can I minimize the inconvenience of having to upgrade my file/print? The question is: How can I maximize the benefit of doing so? It seems that Y2K is about more than just surviving the turn of the millennium. Windows NT Server proves that it's equally about making the most of what's left of the 1900s, and getting the 2000s off to a flying start.

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Carriers & ISPs

Covering: The Internet • Interexchange and Local Carriers • Wireless • Regulatory Affairs • Voice Equipment

Briefs

Emerging national broadband carrier **Qwest Communications International, Inc.** *took one step forward and one step back in its drive to ramp up its installed base. On June 5, the company completed its acquisition of long-distance carrier* **LCI International, Inc.** *But the day before, a Seattle federal judge halted Qwest's marketing of voice services through US WEST, Inc., saying the arrangement was tantamount to letting US WEST into the long-distance business without regulatory approval. Qwest President Joseph Nacchio said Qwest will continue to market on its own in US WEST's territory. AT&T hailed the decision, even though it had said it wanted to enter into similar deals with Bell companies with the court's approval (*NW*, May 25, page 8).*

Ericsson, Inc. *is moving its data and IP equipment operations stateside. The Swedish-based company is opening a Boston headquarters and has appointed* **Michael Thurk** *as its* **executive vice president and general manager** *of the Datacom Networks and IP Services Business Unit. Thurk has nearly 20 years of experience in the communications industry, 14 of which were spent at Digital Equipment Corp. His most recent management position was president of Xyplex Networks.*

Ericsson, Inc. **also announced Phone Doubler Quick Call (PDQC),** *a software system that lets World Wide Web shoppers click a button on a Web site to immediately talk with a call center agent. PDQC is expected to work with any call center switching system when it is available next quarter. But the software is designed to work only with Ericsson's Internet Protocol Telephony solution for Carriers gateway.*

☎ Ericsson: (972) 583-5481

MCI sets pricing for frame relay SVCs

By David Rohde

Richardson, Texas

After years of hearing that it's "just around the corner," users are finally going to get a crack at the dial-up equivalent of frame relay connections.

MCI Communications Corp. late last week was scheduled to file its long-awaited tariff for frame relay switched virtual circuits, becoming the first U.S. carrier to enter the SVC market.

SVCs are temporary paths through a frame relay network, with a call set-up and tear-down routine similar to telephone calls. Unlike frame relay permanent virtual circuits (PVC), SVCs do not have to be provisioned in advance between two user sites in the network.

An advance copy of MCI's SVC pricing provided to *Network World* shows that MCI will offer the service for the same basic price as its PVC offering: 5.5 cents per megabyte up to the committed information rate or 4.5 cents per megabyte for data bursts up to the carrier's port speed.

However, MCI will set a much higher pricing cap for SVCs than for PVCs. At lower speeds, the maximum monthly charge — the level at which all further usage is free — for SVCs is triple that for PVCs.

MCI officials said they had to set the levels that way to make sure they did not cannibalize their own existing frame relay traffic. "This was the best way to make sure that customers don't dump all their PVCs," said Melanie Hanssen, MCI's executive manager for frame relay services.

A HIGHER CEILING

Users can rack up potentially higher monthly charges on an MCI SVC than on a frame relay PVC:

Speed, bit/sec	Maximum monthly charge PVCs*	 SVCs*
64K	$16	$48
56K to 64K	$47	$141
512K	$472	$1,180
1,024K	$1,050	$2,363

* These are monthly caps; actual charges for both PVCs and SVCs are 5.5 cents per megabyte up to the subscribed speed of the circuit or 4.5 cents per megabyte for bursts up to the carrier's port speed.

SOURCE: MCI, Washington, D.C

Despite the cap, SVCs can still save money over PVCs. Reason: Users don't have to mesh their circuits among multiple sites. Once an SVC is established for a given site, that single SVC can reach all of the other SVC sites. Under traditional frame relay networking, the number of PVCs can multiply to several times the number of user sites just to make sure they can all communicate with one another.

For these reasons, SVCs are well-suited to any application that requires broadcast messages from any site, such as an intranet application, Hanssen said. She cautioned that each SVC site must have a router or frame relay access device (FRAD) that supports the Frame Relay Forum's SVC implementation agreement. Cisco routers that support Release 11.2 of Cisco's Internetwork Operating System fit the bill.

In addition, "someone who has a number of sites that need to connect at high bandwidth at intermittent times could use this," said Dawson Newberry, MIS director for MCI customer Gerald Metals, Inc. in Stamford, Conn. The problem is that the SVC pricing would have to be compared not so much with frame relay PVCs but with private lines, Newberry said. "For me, private lines are a better deal because I have enough traffic to justify them, and I can run both voice and data on them."

The carrier is not ready to do call-by-call accounting to boost the SVC usage charges. That means MCI will initially charge a flat rate and change the SVC tariff to the full usage-based pricing when the testing of call-by-call bill accounting with its Bay Networks, Inc. switches is complete. That will probably be in August, Hanssen said. ■

Gric: Roam if you want to

Internet consortium plants stake in IP telephony.

By Denise Pappalardo

ISP consortium Gric Communications, Inc., last week announced its first IP telephony service.

The company's GricPhone is a voice-over-the-Internet service that will ultimately let users make PC-to-PC and phone-to-phone calls from around the world. But before you call Fiji from your laptop, note that this service is a long way from ubiquity.

Gric primarily offers Internet roaming and settlement services over its virtual network. The company's backbone consists of a mesh of more than 300 ISPs' partner networks. The services let Gric ISP partners offer their Internet access service customers local dial-up access to the Internet from around the world using their standard ID and password.

Expanding on the idea of portable services and applications, the GricPhone service is expected to let users make voice calls over the Internet regardless of their location, said Bill Cartmill, senior product manager for GricPhone. By dialing a toll-free number, users should be able to make Internet voice calls from anywhere.

But the random nature of the Internet may threaten the acceptance of voice over the 'Net because there is too much unpredictable delay, said Dan Merriman, a vice president at Giga Information Group, Inc., a Cambridge, Mass., consulting firm. Currently, voice over the Internet is not going to replace corporate public switched telephone network calls, he said.

Gric is trying to address IP voice delay issues by guaranteeing maximum latency will not exceed 400 msec across the network. If one of Gric's ISP partners can't meet that guarantee, the ISP will not be able to offer the Gric service, Cartmill said.

Gric's IP voice services

Gric Communications' new voice-over-IP services include:

- The ability for users to take voice-over-IP service on the road
- Minimum latency guarantee of 400 msec
- Local dial-in numbers in three countries
- Phone-to-phone and PC-to-PC telephony support

And for some small or mid-size businesses, Internet voice services' low cost will override its low quality, Merriman said. Gric's phone service rates will be determined by each service provider, but Gric expects rates to range between 10 and 15 cents per minute.

Gric's service is rolling out slowly. Three carrier partners, in Denmark, Germany and the United States, are offering the service. By year-end GricPhone will be available in 25 countries, Cartmill said.

Due to the lack of interoperability among vendors' gateways supporting the H.323 voice-over-IP standard, Gric is initially only using Lucent Technologies, Inc. products, Cartmill said. But gateways from Cisco Systems, Inc. and Siemens AG will be deployed to support GricPhone later this year, he said.

☎ Gric: (408) 955-1920

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(Over 125 years.)

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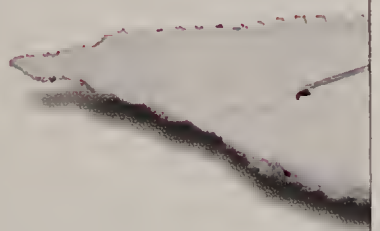

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It helps you set up and maintain an IP network for less (up to 40%). And it's from the people who've got more than a little networking experience. (Over 125 years.)

Going IP?

Let's start a R/Evolution.

What's it going to take to build a better IP network??

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PRESENTER
Jeff Phillips
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Seminar Overview:

As the technology matures to a point of mass user adoption, frame relay continues its explosive growth trend in 1998. Frame relay has proven it can deliver the increased performance and network efficiencies IT managers are looking for while at the same time decreasing their overall operations costs. In addition, carriers and equipment vendors continue to deliver the enhanced services and capabilities necessary for managers to address today's and tomorrow's application needs.

Frame Relay '98 will help you make sense of all that frame relay has become. This information-packed seminar, taught by Jeff Phillips, a frame relay expert with TeleChoice, Inc., addresses the technology from virtually every angle. In this seminar, we will explore everything from frame relay implementation fundamentals to application specifics and the many areas in between. Hot topics such as network management, voice and SNA transport, carrier and equipment vendor offerings, and interoperability will be covered in this powerful one-day session. New features and services available on the market along with their networking benefits will be addressed along with enhancements coming from industry players in the future.

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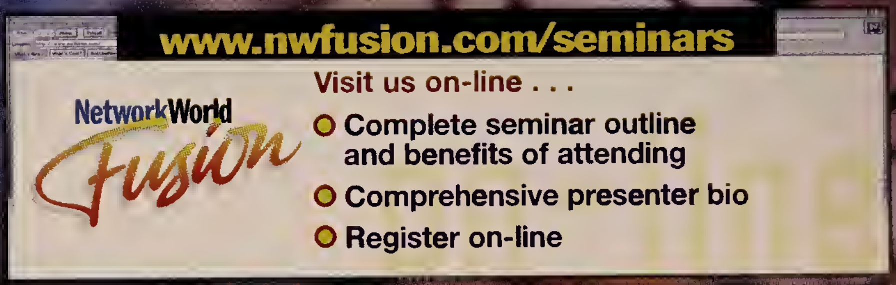
8 Key Benefits of Attending:

1. Explore the inherent benefits of using frame relay
2. Compare and contrast frame relay to other wide area networking solutions including when frame relay is a more economical solution
3. Understand the alternative approaches to running SNA applications over frame relay
4. Understand available network management options and the pros and cons of outsourcing vs. in-house network management
5. Learn how frame relay can interoperate with other networking technologies and why you may want to explore them
6. Learn how to save money by consolidating your voice and data applications over frame relay
7. Analyze the service and pricing differences between the major frame relay providers
8. Learn about new and likely future service and equipment enhancements which could prove advantageous to your networking environment



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Syndesis speeds DSL provisioning

By Tim Greene
Richmond Hill, Ontario

US WEST, Inc. is cutting the time it takes to provision digital subscriber line (DSL) services from hours to seconds by using new software from Syndesis, Ltd.

NetProvision Activator software lets US WEST provision the hardware necessary to turn up a DSL circuit from a single management platform. Today, most provisioning services have to configure lines device by device using separate element-management systems.

"In deploying our DSL services and looking at the scale of the deployment, having this kind of topology engine is absolutely critical. It differentiates our service," said Janice Aune, vice president of operations for US WEST Interprise.

In addition, Cisco Systems, Inc. last week announced it will license and incorporate Syndesis' software in its new Service Management System. The resulting product will be sold by Cisco as Cisco Provisioning Center. As part of the Provisioning Center, Cisco will use NetProvision for building multivendor ATM and frame relay network services such as IP Virtual Private Networks (VPN), voice-over-IP and managed IP services. Bay Networks, Inc. has a similar relationship with Syndesis for its OptivityServices package.

PROFILE: SYNDESIS, LTD.

Headquarters:	Richmond Hill, Ontario
Founded:	1986
Employees:	100
Funding:	$4 million from Helix Investments
Product:	NetProvision Activator software to provision hardware in multivendor networks
Competitors:	Micromuse and Ascend
Fun fact:	All of the internal networks at Syndesis are named for the great beers of the world.

If software such as NetProvision Activator had been widely deployed, it could have doubled the installation of VPNs last year, according to Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J.

Last year, users bought $1.1 billion in VPN services, but only $170 million worth of the services were actually turned on, according to CIMI research. "The problem was manifold, but part of it has to do with [provisioning that] Syndesis is working to address," Nolle said.

In US WEST's case, NetProvision Activator is used to set up circuits between DSL multiplexers made by Cisco and ATM switches made by Newbridge Networks, Inc. or Cisco.

Without NetProvision Activator, a technician would have to tap into each mux or switch individually from a separate management platform and provision each box to set up a circuit. With NetProvision Activator, a technician can define a circuit and the actual provisioning is automated.

"Today, the way people do that is with swivel chairs and multiple management systems. One of NetProvision Activator's key roles is to eliminate all of that," said Douglas Chapman, vice president of product marketing for Syndesis.

✆ Syndesis: (905) 886-7818

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EYE ON THE CARRIERS

You say you want a revolution?

Picture this: You're a happy Sprint frame relay customer, but you use several carriers for voice service because your company's had some mergers.

Now word's out that you want to integrate all your voice and data contracts, and Sprint competitors are coming in with some aggressive proposals.

Even better, you have Sprint's cooperation to experiment with voice over frame relay to eliminate intracompany tolls entirely.

Suddenly, Sprint CEO Bill Esrey announces something called the Integrated On-Demand Network, or ION. He claims ION can put all your voice, data and video traffic on one converged network at a massive reduction in cost, apparently using technologies such as ATM and digital subscriber line (DSL). Unfortunately, details are sketchy, and your Sprint rep is clueless about ION.

Now what do you do? Keep negotiating and experimenting with what you thought was available or get this new ION baby installed, whatever it is?

This scenario, which happened to a user, shows what happens when the real world of enterprise networking meets the fantasyland of vendor jockeying, corporate image and Wall Street perception.

Sprint really does have a high-speed backbone theoretically capable of tremendous advances in voice and data transport efficiency. But at the moment, Sprint's not ready to announce any actual convergence services or reduce data networking prices. So why the ION announcement now? There are three main reasons:

David Rohde

- Esrey seems annoyed at all the publicity Qwest and Level 3 are getting promoting a brave new IP world free of legacy carrier systems. In their hearts, all traditional carriers think voice over IP is a crock, and Sprint is pushing ATM as the convergence protocol of choice. But it would be no good to announce the Integrated ATM Network. To make the front page of *The Wall Street Journal,* Sprint had to come up with a gimmick that played into IP convergence hype without actually endorsing it.
- After years of hesitation, Sprint basically has decided not to become a competitive local exchange carrier. Instead, it'll be leasing regional Bell operating company fiber for dedicated connections, and it claims it'll somehow lease DSL lines from RBOCs for dial-up connections, even though the rest of the telecom industry thinks that's next to impossible. Sprint's announcement made a defensive local strategy sound bold.
- Sprint's had a bit of a tough time recently. Its venture with cable companies, which originally was supposed to create end-to-end services, is petering out. Its Global One international venture has suffered a management shake-up.

So what do you do with this new information? Here's a final tip: Esrey said ION is "revolutionary." Oh boy. Want to propose a revolution to management in your next budget?

So go ahead and try that voice over frame relay experiment, and keep negotiating down those long-distance rates. You'll have results back long before Sprint announces any real ION services — or their prices.

Rohde is Network World*'s senior editor of Carriers & ISPs. He can be reached at david_rohde@nww.com.*

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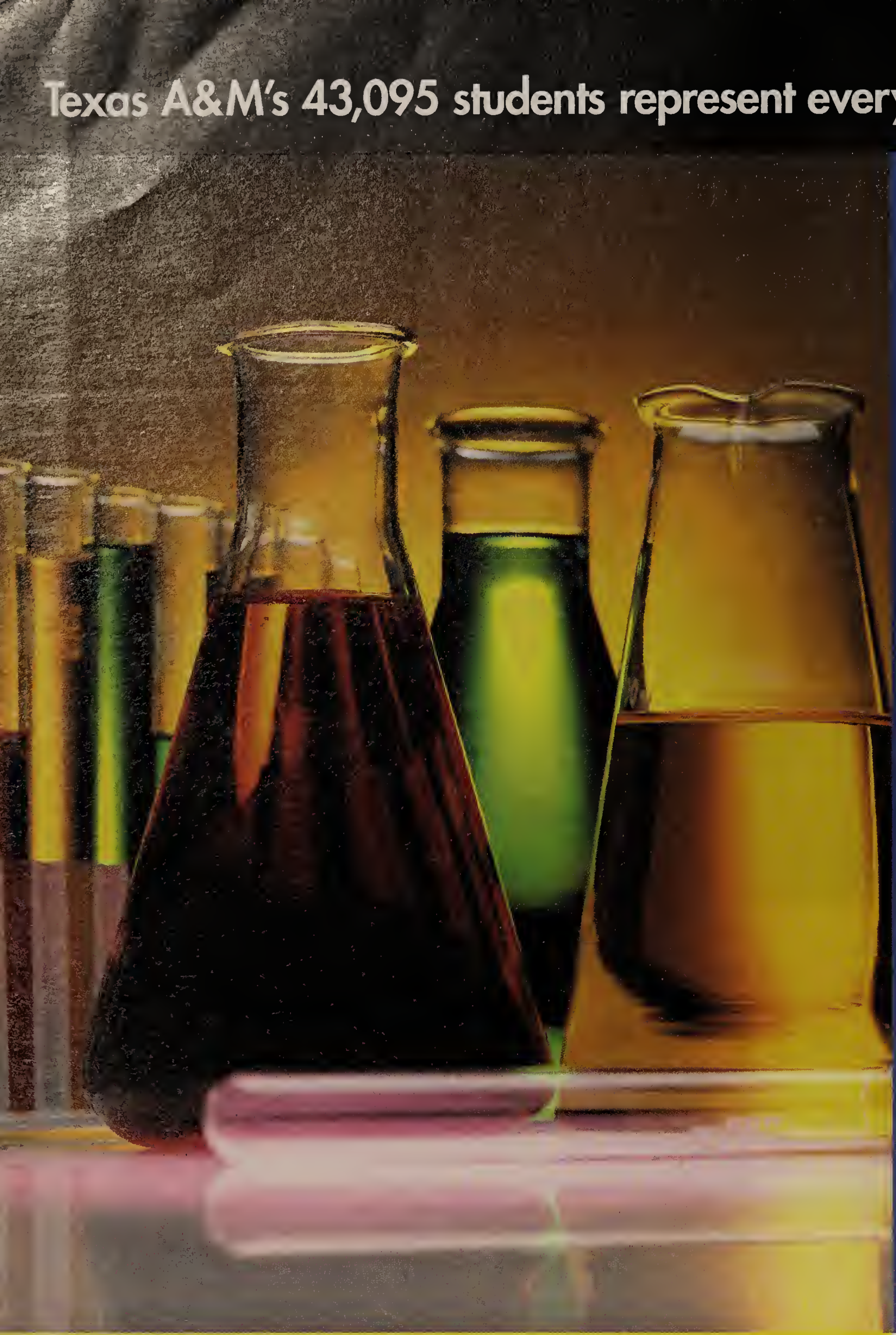

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network?

Xylan.

Texas A&M is the nation's sixth largest university in terms of student enrollment and first in geographic size. With its main campus network in College Station, along with networks in sister institutions across the state, Texas A&M wanted to unify its network infrastructure. "What we needed was a technology that would allow us to upgrade our network incrementally, without having to wait until everything was switched over to receive the benefits," says Willis Marti, senior lecturer and director of computing services in the department of computer science at the University. "We found that the Xylan switches that were provided and supported by Anixter provide an incredible degree of flexibility in integrating and configuring both legacy networks and new technologies."

"We recently made a decision to push the switched Xylan solution all the way to the dorms," adds Dave Hess, director of networking at Texas A&M. "Each student will have his/her own switched port. This lets us deliver higher bandwidth, and provides a means for the University to achieve its security goals via the embedded Xylan authentication capabilities."

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Intranet Applications

Covering: Messaging • Groupware • Databases • Multimedia • Electronic Commerce • Security

Briefs

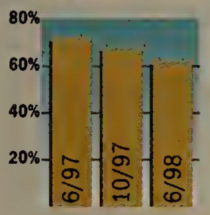
■ **TriStrata Security, Inc.,** *a start-up launched by Atalla Corp. founder John Atalla, has announced its first product, the* **TriStrata Enterprise Security Server.** *The specialized high-speed encryption server, which sells for $2.55 million for 20,000 users, handles authentication, access control and policy-based encryption of stored and transmitted data. The system works based on a proprietary system of digital signatures, and has been granted export approval for Data Encryption Standard and Triple-DES encryption by the U.S. Department of State.*

✆ TriStrata Security: (650) 596-1757

■ *A study by monitoring software maker* **Elron Software, Inc.** *found that 62% of responding companies had employees that* **accessed pornographic Web sites during work hours** *(see graphic). Companies are responding to this issue. Some 27% of the companies have taken action against employees for abusing the World Wide Web. Half of the respondents have Internet acceptable use policies, while 43% plan to create policies.*

REPORTS OF SURF-ABUSE INCIDENTS

Web abuse is declining survey says.



■ **The Knowledge Management Consortium,** *an organization formed last December to advance this growing yet nebulous market segment, last week announced it has established* **four task forces.** *The task forces will define knowledge management; create a Universal Knowledge Language; establish standards for quantifying and measuring knowledge; and address the integration of workflow with knowledge management. Information is available at the group's Web site at www.km.org.*

In-Site

Revamped Web site to take flight at American Airlines

By Ellen Messmer

Fort Worth, Texas

American Airlines, Inc. next week will unveil its retooled Web site, the result of a $1 million make over designed to help the airline deliver more personalized service to the thousands who buy tickets online.

The new Web site, for instance, will enable the airline and its business partners to present information about events and services available to travelers heading to particular cities. In addition, the site will give Web surfers the opportunity to shop for tickets by price and only price — perhaps a first for the online travel industry. "Targeting your message is a proven marketing activity," said John Samuel, managing director of interactive marketing at American. "We've been working nine months on the capabilities we're rolling out. We're introducing a lot of new concepts."

American today has a somewhat awkward system that requires visitors to obtain two separate logons — one to use travel booking tools and another to use other American travel services, Samuel said. This system will be replaced with a single sign-on procedure that involves issuing users a temporary personal identification number online and sending a permanent one via the mail.

American's Samuel *spent $1 million on the company's Web site.*

STELLA JOHNSON

With the overhaul of its 2-year-old Web site, American is trying to learn more about the people visiting the airline online. American's Web site already gets 23 million page views per week and has 1.6 million people registered to receive weekly e-mail updates about ticket prices. American sees electronic commerce as its direct flight to future growth, even though the $140 million in tickets American sells via the World Wide Web represents just 1% of the airline's total annual sales.

For instance, Web-based electronic commerce offers a way to build brand loyalty among young professionals, said Samuel. "Everything we've done in the past in marketing is based on Platinum and Gold lists of frequent fliers," he said. "A college grad who becomes a consultant wouldn't show up in our Platinum and Gold travel miles program, but that person is probably going to travel a lot."

Based on the information Web visitors are willing to divulge to American, the airline next week will begin tailoring page views and messages to its customers. If someone likes golf, for instance, the Web site could provide information about courses in a traveler's destination city.

The personalization magic will be provided via BroadVision, Inc.'s One-to-One software, a set of Common Object Request Broker Architecture application services that link Web front ends to back-end databases that store information on users as well as marketing messages.

As middleware, One-to-One is installed on servers that include a profile manager and contact manager. Intelligent agents based on Iona Technologies, Inc.'s Orbix object request broker fetch information and combine data.

American's biggest challenge in revamping its Web site has involved content creation, according to Samuel. The company has hired a raft of editors, graphic artists and proofreaders.

"We're becoming like a newspaper," Samuel added. ■

Starlight unveils streaming media manager

By Chris Nerney

Mountain View, Calif.

Starlight Networks, Inc. today will introduce a software package that makes it easier for companies to manage streaming multimedia applications across an enterprise network.

The new client and server product, dubbed StarCenter, automates the storage, delivery and access of streaming media applications running off a variety of servers and desktop players.

Streaming media technology allows end users to hear or view information as it arrives, rather than have to wait for an entire file to download. Users with StarCenter client software can access executive presentations, satellite news broadcasts, training videos and live corporate meetings. The product works with several streaming media players, including Microsoft Corp.'s NetShow and RealNetworks Inc.'s RealVideo and RealAudio.

StarCenter's video server can store multiple versions of media files, such as RealVideo and MPEG, and give end users the appropriate available version based on reading how much bandwidth they have to their desktops.

One early beta user, a systems integrator, has installed StarCenter at the lawnmower division of John Deere, Inc. in Horicon, Wis. Dale Jessen, president of Computer Analytics Corp. of Chicago, said the Deere unit has been using StarCenter for the past two months to help employees meet a requirement that they view 20 hours of training videos per year.

Jessen said StarCenter's usage reporting function is particularly valuable. This function provides Deere with the information it needs to track which employees have been viewing videos and for how long, he said.

StarCenter's server software runs on Windows NT 4.0. The client software works on Windows 95 or NT 4.0 workstations. StarCenter is scheduled to be commercially available this summer. Pricing is based on the number of media servers managed and begins at $25,000. Client software is free.

✆ Starlight: (650) 967-2774

Get more online:

- Starlight's overview of the technology
- A look at Microsoft's moves into streaming technology
- Details of RealNetworks' latest streaming software

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'NET INSIDER

Internet-based Internet governance

It was not as easy as some people had said it would be.

Almost a year ago, the U.S. government started figuring out what to do about domain names. The government published a request for comment relating to Domain Name System (DNS) administration, top-level domain (TLD) creation and related issues, such as the impact trademarks should have on domain names. The request successfully resulted in turning up ideas on these issues.

A number of respondents maintained there were easy solutions for the issues. But the respondents were wrong.

Six months later, the government solicited comments on a draft proposal, known as the "Green Paper," on how to deal with the DNS issues as well as a number of other Internet management problems. The basic proposal was quite good, but a number of the details evoked a great deal of consternation.

Now — after another six months — the U.S. government has published its final plan. By removing some of the policy predefinition, the government has come up with a very good plan.

Like the Green Paper, the final white paper defines an independent, nonprofit U.S. corporation that will be responsible for a number of the basic Internet infrastructure functions: setting policy for and directing allocation of IP address blocks to regional IP number registries; overseeing the operation of the root name servers; overseeing policy for the creation of new TLDs; and coordinating the assignment of Internet technical parameters. These functions are a combination of operations and policy.

The execution of the policy portions of these functions will be the first explicit instance of Internet governance, even though the white paper maintains that it is not defining any such thing. The paper says this new organization will not displace existing laws but will be defining policy, and that is a governance function.

Scott Bradner

Almost all of the Internet's growth has taken place over the past five years, yet in this very short time, the 'Net has had a profound impact. The government proposal is an indication of the impact. It is impossible to imagine a major world government would have had the vision a decade ago to define nongovernmental governance of such a vital resource. The traditional way to deal with this type of issue has been to have a national governmental organization, such as the Federal Communications Commission, or an international intergovernmental organization, such as the International Telecommunication Union, take charge.

This new U.S. government plan hands responsibility for vital policy development over to the Internet community. It is a big responsibility, and there will be some challenging times ahead as representation details are worked out.

There will be legal challenges from people who don't like the idea of a consensus-based policy development process. I hope the new organization will be able to deal with the challenges and meet its obligations to the Internet community.

This is the right thing to do.

Disclaimer: Harvard has no consistent view of governance (its own or others'), so the above must be my view.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@ harvard.edu.

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SPECIAL FOCUS

Electronic commerce

Business-to-business boom

By Ellen Messmer

Whether your goal is to have employees order office supplies electronically from their desktops, or to buy and sell online with trading partners, a new class of business-to-business applications based on electronic catalogs is there for you to carry out your plan.

At costs that generally range from $100,000 to a cool million, these "b-to-b" electronic commerce applications don't come cheap. But those taking the Web-based procurement plunge believe that in the long run, online catalogs will eliminate processing costs.

Almost two years ago, Boehringer-Ingelheim Pharmaceuticals, Inc. decided to take a fresh look at how employees bought office supplies and biochemicals, as well as how the company processed procurement information. Based on the findings of an internal procurement engineering team, the company's financial management group decided electronic catalogs tied to a workflow-based approval and routing system could lower processing costs and make it easier to keep track of purchases.

Boehringer-Ingelheim chose an Ariba Technologies, Inc. product called the Operating Resource Management Systems (ORMS). This week, 120 employees at Boehringer-Ingelheim will start ordering supplies via ORMS Web-based catalogs. "We have 7,000 items online. By the end of the year, we intend to have 500,000," says Greg Schnuck, purchasing manager for research and development at Boehringer-Ingelheim in Richfield, Conn.

Boehringer-Ingelheim has been able to influence Ariba's development of ORMS. For instance, the pharmaceuticals giant wanted ORMS available for Hewlett-Packard Co.'s Unix, and Ariba agreed. A Unix version of ORMS is now ready to ship.

"The way it's designed, the first time you access the Ariba system it requires you to fill out a personal profile, who your supervisor is, what building you are in and how much you want to spend," Schnuck says. "The profile will have to be approved by the supervisor. And we sat down and designed a process of rules that are required."

The cost of the Ariba electronic catalog system has been about $500,000. "I'm lucky that our sponsor is the chief financial officer of the corporation," Schnuck says. "It's a sizable investment, and we have high-level sponsorship."

Ariba is not alone in this big-ticket business-to-business electronic commerce market. Household names such as IBM and Netscape Communications Corp. are duking it out for market share in a crowd of lesser-known upstarts that includes Commerce One, Inc.; Connect, Inc.; BroadVision, Inc.; Elcom Systems, Inc.; Open Market, Inc.; InterWorld Corp.; SpaceWorks, Inc.; Connect, Inc.; RightWorks, Inc.; Intershop Communications, Inc.; Snickelways Interactive, Inc.; and Trade'ex Electronic Commerce Systems, Inc.

All the vendors' products can present personalized Web catalog views and a way to generate purchase orders and requests. Most do far more, such as giving distributors a way to view inventory availability and providing ways to link into back-end Enterprise Resource Planning systems.

But each of these packages uses different ways to format catalog information, which can make it burdensome on the supplier asked to handle the different formats.

Mike Janes *keeps FedEx close to its shipping roots.*

PHILLIP PARKER

In general, these electronic commerce applications do tend to differentiate themselves as "sell-side," for use by the seller, or "buyside," for use by the buyer. However, IBM's Java-based electronic commerce package, Net.Commerce Pro, "is agnostic as far as a buyer or seller scenario," says Dave Liedderbach, director of electronic commerce programs at IBM. Used by Goodyear Tires Corp., Dunkin' Donuts, Lehigh Valley Stores and MicroAge Corp., Net.Commerce Pro starts at a breathtakingly low $19,995. But costs accrue once you start customizing it for back-end integration using the IBM Java-based APIs.

When Federal Express, Inc. wanted to leverage its package-shipment expertise into the broader world of electronic commerce, it went sifting through this vendor mix in order to find the right partner for the development of shipping software.

As a result, FedEx recently struck a deal with InterWorld Corp. that calls for the firm to integrate FedEx APIs related to shipment costs and logistics into the next version of the InterWorld business-to-business application, Commerce Exchange.

Scheduled to be available in the third quarter, the FedEx-enabled version of Commerce Exchange will let the user easily obtain and compute FedEx shipping charges, arrange for returns and integrate with order management. FedEx is teaming with InterWorld "because [the company uses] process-centric computing that allows for flexibility and customer changes," says Mike Janes, vice president of electronic commerce marketing at FedEx. "We may eventually ally with others, but InterWorld is the first."

The idea of electronically enabled buying and selling has been around for a long time. Most Fortune 1000 companies have been using one form or another of this older technology, called electronic data interchange, going back 25 years.

However, traditional EDI, which evolved from mainframe processing, usually depends on store-and-forward messaging of EDI transactions and has rarely been used for PC-based procurement. But when Boston Edison, a big EDI user, decided to put up an electronic catalog for ordering supplies, the public utility wanted the online ordering system to generate EDI-based data.

Boston Edison picked the Elcom Procurement Manager, a client/server application that lets employees buy from EDI-based electronic catalogs and generate the orders in the form of EDI purchase orders. The orders are sent over Boston Edison's value-added network provider, GE Information Services, Inc.

Suppliers such as Reynolds, Inc., Staples, Inc., W.W. Grainger, Inc. and Vanyo, Inc. today get EDI orders in this way from Boston Edison, where about 10% of employees — roughly 350 people — use the online ordering system, says Tom Murray, the utility's group manager for logistics.

As a beta user of Elcom Procurement Manager, Boston Edison got the software for a bargain-basement $25,000 nearly two years ago. "But we put in a few hundred thousand of our own development blood money," says Liisa Niemi, Boston Edison's process management project manager.

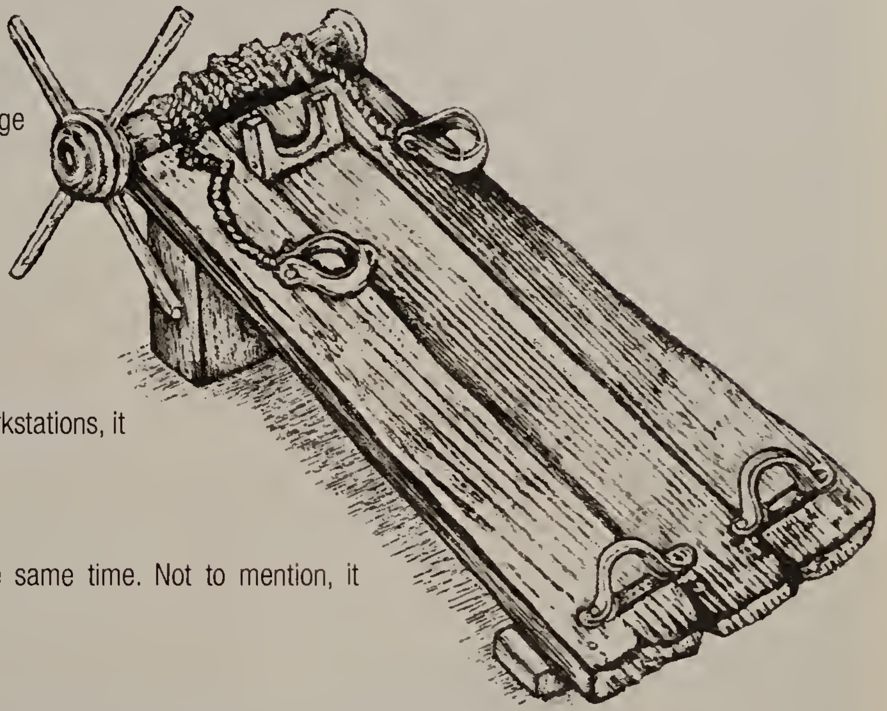
The new world of Web-based electronic catalog procurement is beckoning entrepreneurs who envision building business from scratch in cyberspace.

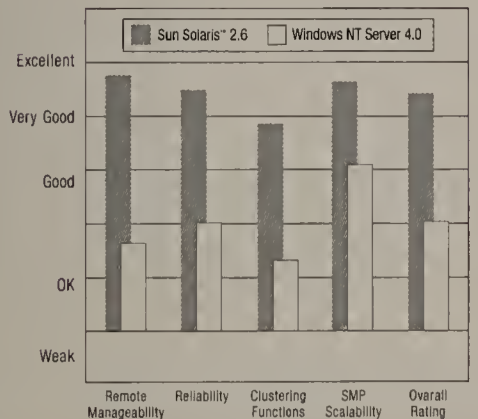
One who has done just that is David Perry, president and CEO of Palo Alto, Calif.-based Chemdex Corp., a middleman distributor of specialty life-science chemicals to biotech firms such as Genentech Corp. Chemdex has gathered about 40 electronic catalogs from large and small suppliers so biotech companies and research organizations can see what's available at the best cost.

But Perry has a warning for others. "It takes a serious amount of customization to make this work," he says. "No prepackaged software ever does everything for you." ■

RUNNING ENTERPRISE APPLICATIONS ON AN NT SERVER?

Whatever you choose to do in the privacy of your own office is your business. But if you rely on a Microsoft Windows NT Server to run your company's key business applications, the result could be torturous. In fact, according to D.H. Brown, servers running on Windows NT "continue to fall short of being able to support enterprise requirements.*" So why not indulge in something a bit less agonizing? The Sun™ Enterprise™ 450 Workgroup Server, starting below $15,000, not only delivers print and file services for your PCs and workstations, it runs multiple enterprise applications at the same time. Not to mention, it whipped NT in datawarehousing, Lotus Domino, Web and SAP performance. And because the Sun Enterprise 450 is part of a family that scales up to 64 processors, you'll never have to sacrifice business-critical scalability. Plus, Sun supports their entire line of servers with worldwide customer service. So call 800-SUN-FIND or visit sun.com/wgs/nwd to avoid a potentially painful situation. Unless, of course, you're into that sort of thing. THE NETWORK IS THE COMPUTER.™





*D.H. Brown Associates, Inc , March 1998

Sun microsystems

WHAT IS IT YOU PEOPLE DO FOR FUN?

*Refers to D.H. Brown Associates, Inc., *Solaris Outpaces NT For Enterprise's Intranets*, March 1998 study comparing Microsoft's Windows NT Server 4.0 with Sun's Solaris 2.6 operating environment. ©1998 Sun Microsystems, Inc. All rights reserved. Sun, Sun Microsystems, Solaris, Sun Enterprise, the Sun Logo and The Network Is The Computer are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries. Other trade names are the property of their respective owners.

Bruce Kirkby OAS 1997

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Technology Update

Covering: Evolving Technologies and Standards

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 7476, or send your questions to rnutter@world.std.com.

We decided to go with Novell, Inc.'s NetWare for SAA 3.0 and Hostprint/400 to minimize the setup problems we have had while using IBM Client Access to get to our AS/400. We were able to get the SAA product installed and running without too much trouble, but Hostprint/400 isn't cooperating. I have put the patches in place for SAA as prescribed by IBM, but Hostprint/400 still won't install. I keep getting an error message saying the minimum version of SAA required is 1.3B. I am using Version 3.0, so what's the problem?

Via the Internet

When SAA 3.0 came out, Novell changed the name of the product from NetWare for SAA (NWSAA) to IntraNetware for SAA (INWSAA). Therein lies the problem. Hostprint is looking for NWSAA, not INWSAA.

To remedy your problem, the first thing to do is make a disk copy of the Hostprint/400 diskette. Using a DOS text editor (or Windows notepad as long as you save the file back in text mode), edit the product.def file on the Hostprint/400 diskette. Look for the NWSAA v1.3 line and change it to INWSAA v3.0. Using the disk copy, you can now install Hostprint/400.

After the installation has finished, copy the HP400.NLM and STAMPHP4.NLM from the Hostprint directory on your IntraNetware for SAA CD onto a floppy. Insert the floppy in the server, and at the command prompt, type "LOAD A:STAMPHP4" and press "Enter."

STAMPHP4 will copy the serial number and session count into the new Hostprint/400 NLM. When the command prompt returns, remove the floppy. You can now proceed with configuring HP400 as outlined in the quick start card included with the product.

Blinded by the wave-division light

By José Maria Daza and Roselyne Genin

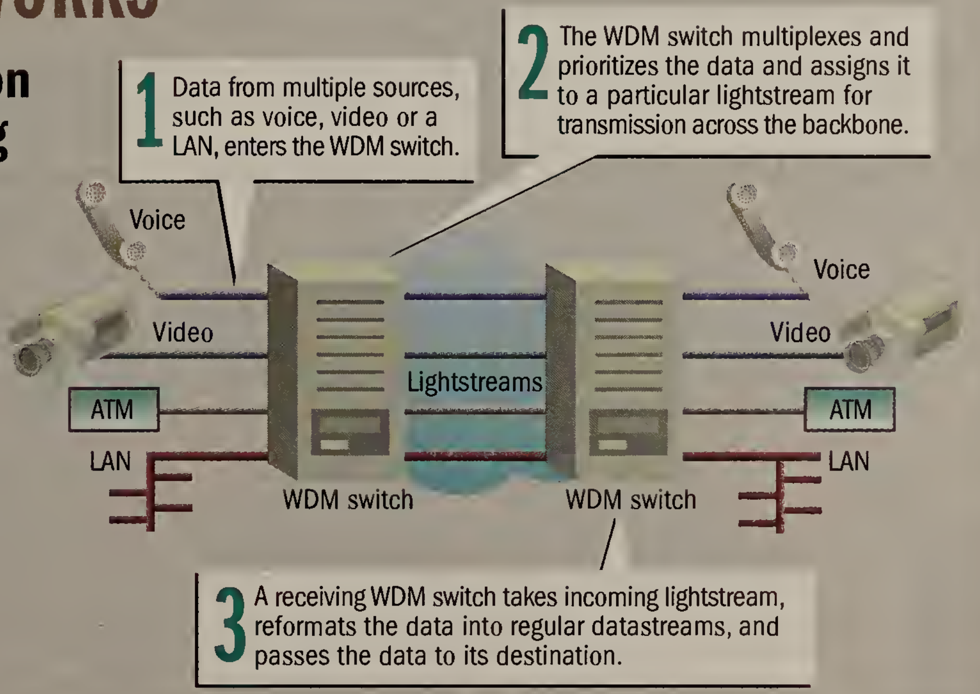
If you haven't heard of wave-division multiplexing (WDM), you probably will in the coming months.

WDM and a closely related technology, dense wave-division multiplexing (DWDM), are giving large users, telecommunications carriers and competitive service providers the opportunity to quickly increase bandwidth capacity and speeds.

HOW IT WORKS

Wave-division multiplexing

WDM is a technology that transmits different types of data at distinct optical wave-lengths — or colors of light — over a single fiber channel. the technology will let users transmit large volumes of data, video or voice over a fiber backbone.



1 Data from multiple sources, such as voice, video or a LAN, enters the WDM switch.

2 The WDM switch multiplexes and prioritizes the data and assigns it to a particular lightstream for transmission across the backbone.

3 A receiving WDM switch takes incoming lightstream, reformats the data into regular datastreams, and passes the data to its destination.

Under consideration

WDM is useful for large companies whenever high-speed interconnection is needed between widely dispersed sites. The technology is also important for corporations that maintain multiple data centers, either for distributed applications, disaster recovery or CPU redundancy.

In addition, nearly every major telecommunications carrier is considering WDM technology. Almost all competitive providers are thinking about building their networks based on WDM, whether across the country or within a metropolitan area. The connectivity offered by WDM will bring the LAN, WAN and telecommunications infrastructure closer without requiring new cable installations.

According to researchers, current fiber technologies use less than 1% of fiber cable capacity because the technologies transmit using one wavelength per fiber link. Moreover, the most common method of forwarding traffic over fiber, time-division multiplexing, can't simultaneously handle multiple bit rates, framing types or protocols.

In addition, the Internet has placed a heavy burden on global networks to handle a very different kind of telecommunications traffic. Video services are emerging in which applications swallow bandwidth like finger food, and the use of telephone communications is growing exponentially and globally. For carriers and end users, the issue of increasing capacity to reflect demand can be a multibillion-dollar decision.

When conduit becomes full and the fiber within has been completely used, choices for increasing capacity dwindle. One choice is to dig up roads and lay more conduit and fiber. But WDM and DWDM offer a more appealing answer to the problem of capacity by enabling carriers and users to employ the same fiber with far more capacity.

WDM and DWDM devices get around these limitations by transmitting multiple signals through the same fiber cable. Much like a prism, WDM uses multiple wavelengths, or colors of light, fired down a single fiber to multiply fiber capacity.

WDM switches use lasers to divide incoming data — be it from a voice, video or data device — into separate optical wavelengths, or lightstreams, across a fiber link between two switches. A lightstream basically becomes a high-bandwidth pipe capable of carrying data at gigabit speeds. Each link can carry several wavelengths, using optical WDM. The lightstreams are then mixed together and travel over a single fiber cable to another WDM switch, which demultiplexes the traffic.

The difference between WDM and DWDM is that DWDM lets a lightstream carry multiple types of data on a single fiber. For example, rather than having separate ATM, LAN and video lightstreams, users can get the ATM, LAN and video on a single strand.

WDM and DWDM let users or service providers set priorities, as well. If ATM traffic needs to arrive before IP, switches can be configured as such.

Some WDM products, such as IBM's Muxmaster, let users link remote locations up to 31 miles apart. And some companies, such as Ericsson, have been working with DWDM to combine lightstreams into a single wavelength, boosting by up to four times the capacity of a single lightstream.

In addition, backbone stalwart Cisco Systems, Inc. recently said it would begin offering switches and routers that deploy WDM and DWDM interfaces. Cisco is teaming with Ciena Corp. to deliver optical internetworks based on Cisco's high-end switching and routing platforms and Ciena's DWDM equipment.

WDM is an equal-opportunity system for users or carriers that need to share infrastructure between several technologies. For example, WDM supports high-speed connectivity to ATM, and bridges the LAN, WAN and telecommunications networks.

WDM and DWDM are two of the fastest ways to build an infrastructure capable of proving new bandwidth with minimum delay. Installing new capacity — if you have a WDM backbone — is faster than installing new fibers and new client technology from scratch.

Daza is vice president of business development in the Transport and Cable Networks business unit of Ericsson Telecom. Genin is vice president of optical networking solutions for Ericsson U.S.

Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Michael Cooney at (508) 875-6400 or michael_cooney@nww.com.

EDITORIAL *insights*

I was just thinking . . .

I know what you're saying: "Here's a real original way to write a column." You are right. I am not the most imaginative guy in the world. But here's what I am thinking anyway.

What is the deal with Java? I mean, corporate network computers went out of style right before they shipped. And along with the death of NCs died the idea of applets replacing basic productivity applications — software many of us are finally starting to master. Nobody bothers to give this news to the hundreds of thousands of programmers who continue to code away. So what the heck are they building? All this effort must be changing something, but no one seems to know what it really is. I'm dying to find out.

And what is all this hooey about Windows 98? If you listen to Microsoft, Win98 is for all those wimpy home folks, and the more powerful NT is for macho business types. Microsoft has got it butt-backwards. The home has always had the real computers. Who moved to Win95 first? Who bought Commodore Amigas? Who bought OS/2? Well, maybe those aren't such great examples. But who got stereo speakers and CD-ROMs and color printers first? That's right — good old American moms and dads.

People in their houses go nuts over all these new programs, buying or downloading the latest, greatest — and also the biggest — software. Ever try to run Monster Truck Madness in 4 megs? It's not pretty. Maybe Microsoft should just get plain old Windows to stop crashing all the time instead of pushing NT.

What's up with bandwidth? All these high-speed lines we have at work are a dream. But what about the poor schlubs at home, with their souped-up machines, watching their modems gag on a simple home page? I'm starting to think that most browsing for enjoyment and buying on theWorld Wide Web is happening at work. Not in my case, of course. But those other people. . . . Give me DSL, please!

And what is Microsoft Word's problem? I know this is a network newspaper, but this thing has got me plenty steamed. Let's see now, Word has what, 1,298 features? Some of them are even useful. But why can't it do the simplest things right, such as scrolling. Ever try to cut and paste more than a screen's worth of stuff? The cursor goes winging way past where you want. So you back up, and it wings way past where you started! Makes you feel stupid, until you realize it happens to everyone using every version. It almost makes me yearn for an Ellison/McNealy inspired Java word processing applet. You wouldn't have to worry about that baby scrolling too fast!

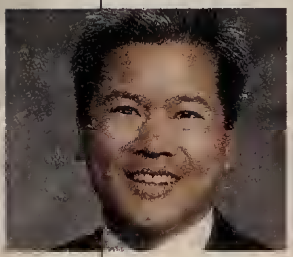
Doug Barney, news editor dbarney@nww.com

Venture over the horizon • Kevin Fong

Storage-area networks are this summer's hot technology

You know all about LANs, WANs and MANs. Now get ready for SANs.

Large corporations are beginning to use SANs — storage-area networks — to connect large disk storage arrays to the clustered servers on the local network. Using Fibre Channel interconnections, SANs deliver massive packets of data to the servers at gigabit speeds. With a SAN in place, you can build a large Web site that gets its information directly from the corporate database or delivers data files quickly to workers on the LAN.



The triumph of the Intel microprocessor architecture and the ready availability of large disk arrays have provided the basic infrastructure for SANs. In the past, if you needed fast I/O, you had to hook up a disk array from EMC or Storage Technology to an IBM mainframe to achieve the necessary speeds. Fibre Channel, which has been around for many years, provides an easy and cost-effective way to get fast I/O between clustered servers and disk arrays.

Fibre Channel solves several problems for managers running big data farms. It is faster than even the new Ultra 2 SCSI adapters and can transmit over longer distances. And while Fibre Channel's reliability equals that of Ethernet, it does not require higher level protocols — overhead inherent in IP switching that limits throughput. In addition, Fibre Channel already has approved standards, which eliminate uncertainty over interoperability.

The emergence of the Internet and corporate intranets are driving network managers to adopt SANs for direct access to data. The growth of data-rich video files also favors an interconnection that moves big packets at high speeds.

From a network manager's perspective, SANs are not difficult to set up. Fibre Channel is not a new technology. What's new is that it is being given a network topology. Since SANs operate as separate networks, all they require is a Fibre Channel interface on one side of the servers in the LAN. Any time you introduce a faster I/O, certain issues need to be resolved. But on the whole, setting up a SAN is about as painless a network task as you can get.

From the venture perspective, SANs are hot because none of the big network companies have indicated any real interest in becoming significant players. Cisco and 3Com have focused on the LAN and WAN — specifically, router and switch requirements. Consequently, start-ups such as Santa Clara, Calif.-based Brocade Communications; San Jose, Calif.-based Gadzoox Microsystems; and Bothell, Wash.-based Vixel have emerged as leaders in providing SAN solutions. (Vixel is the only one of the three in which Mayfield Fund is invested.)

Storage companies such as Seagate, Quantum, Storage Technology and EMC also are beginning to address this area. EMC is offering a Fibre Channel switch, and Seagate, which has a strategic partnership with Gadzoox, has disk drives with direct Fibre Channel interfaces.

And Microsoft's Windows NT 5.0 will allow server clustering to be achieved more effectively.

Soon we'll see a network architecture in which disk arrays are attached directly to the network, bypassing the servers that currently act as bottlenecks for fast I/O. When the technology needed to facilitate this direct linkage is developed, SANs will become even more important to network managers.

Now is the time to educate yourself about SANs. A good place to start is Vixel's Web site (www.vixel.com). The University of Central Oklahoma also has a Web page on SANs (www.busn.ucok.edu/tips/info.hrd/san.htm).

SANs soon will be just as important to the functioning of your corporation as traditional networks. The more you know about them, the better.

Fong is a general partner of Mayfield Fund, a venture capital firm in Menlo Park, Calif. He can be reached at kfong@mayfield.com.

MESSAGE QUEUE . .

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification

Satellites are sound

Regarding your article "Grocer bags satellite net" (May 25, page 1):

I have worked in the satellite industry for over 20 years and have found that coverage of satellite networks in the trade press is very limited and often negative. This may be a result of the far larger number of telephony types out there who are only familiar with terrestrial services. This article concerned me because it was placed directly below an article on the Galaxy 4 failure and continued inside on the same page.

I am not sure why Hanna-

The Intelligent Network • Mary Petrosky

View ATM in shades of gray

ATM seems to have fallen into the category of technologies that everyone loves to hate.

We are assailed by regular trade press reports of ATM's woes. In a recent Network World article, the inimitable Bob Metcalfe, one of the fathers of Ethernet, repeated his mantra: "Gigabit Ethernet is kicking ATM's butt." Even the ATM Year 98 conference earlier this month indulged in a bit of ATM bashing, with sessions such as "Did the ATM Forum ruin ATM?"

Is ATM dead? No. Will it take over the world? Clearly not. No technology can. But for some reason, we in the technology industry build up unrealistic expectations of a technology and then blame it when it doesn't rise to the occasion. We paint things in black and white: Either a technology is a success or it's a failure. However, with network technology, as in all of life, few things are black and white.

ATM certainly has its faults. It is relatively expensive and complex. It is hard to understand — let alone implement — the nuances of ATM's classes of service, token-bucket and leaky-bucket traffic policing schemes, and the routing intricacies defined in the Private Network-to-Network Interface specification. And LAN Emulation (LANE) is something of a hack, even if it does work.

But ATM also has many strengths. It has proven to be a solid technology for many enterprise and service providers.

At the enterprise level, ATM is the natural successor to FDDI. It offers scalability and fault tolerance, and acts as an integration point for technologies ranging from Ethernet and token ring to frame relay. Many organizations are using ATM's circuit emulation capabilities to combine their voice and data traffic over metropolitan-area networks. Universities and teaching hospitals are deploying ATM for distance learning and related applications.

Over the years, I've spoken with many IT managers who have deployed ATM. While admitting they had to climb a learning curve with the technology, all are pleased with how easy it is to operate their ATM networks.

Service providers appear to have similar positive operational experience with ATM. In one case reported by Ron Jeffries, principal of Jeffries Research, an ISP noted that it takes the same number of people to support seven routers as it does to support 34 ATM switches.

The reality is there will always be the next Holy Grail of technology, be it Gigabit Ethernet, IP over Synchronous Optical Network (SONET) or Multi-protocol Label Switching. With each new technology, there's enormous optimism about what it can do. But once we begin deploying these technologies, their warts begin to show. Already, we've seen that Gigabit Ethernet has some growing up to do.

In various press reports, vendors of Gigabit Ethernet adapters have confirmed that their throughput is typically less than 500M bit/sec, with Unix systems performing better than Windows NT ones. Even Alteon Networks, using its proprietary large-packet format in conjunction with its Gigabit Ethernet adapter, can push only a little more than 600M bit/sec of traffic on and off a Sun Microsystems Solaris-based machine.

In contrast, The Tolly Group found that 622M bit/sec ATM adapters from FORE Systems, configured with extended packets, achieved throughput in excess of 1G bit/sec between a Unix client and a server, and about half that performance for NT-based machines. (While the Unix machines are clearly superior for network I/O, we all know that Unix is dead and Windows NT is its successor. But I digress.)

Will Gigabit Ethernet survive these growing pains? Of course. But the reality is that if Ethernet endures another 25 years, it will be Ethernet in marketing terms only. Already one of Ethernet's defining characteristics — its carrier-sense multiple access with collision detection access method — has been all but eliminated by the widespread adoption of switching.

Vendors have also begun tinkering with another of Ethernet's associated technologies, the Spanning Tree Algorithm. By the time they're done, Spanning Tree will no longer be Spanning Tree.

Likewise, vendors have already begun experimenting with larger packet sizes. (At least in ATM, extended packet sizes have already been defined under LANE.)

ATM, like Ethernet, must go through a natural maturation cycle and evolve to accommodate market realities. And the industry has already learned a lot from defining and implementing ATM in terms of quality of service issues, routing and switching architectures.

ATM will continue to influence the direction of other technology developments. Far from being dead, ATM is growing slowly but steadily, with the market for LAN-based ATM switches projected to break $1 billion this year, according to Dell'Oro Group in Portola Valley, Calif.

Rather than continue to view ATM in black and white, the industry would be well served to appreciate its many shades of gray.

Petrosky is an independent technology analyst in San Mateo, Calif. She can be reached at (650) 572-0560.

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ford Brothers Co., a company that has been sharing a 19.2K bit/sec satellite circuit with multiple stores, would want to go to a T-1 ATM network to each store in the first place. But to suggest moving 148 retail stores to an ATM network is quicker than repointing to another satellite is ridiculous.

The satellite failed on May 19, and all pager services were restored in two days. Over 75% of all very small aperture terminals aimed at Galaxy 4 had been repointed by May 22. By May 26, one week after the failure, less than 5% of the VSATs had not been restored.

As a consultant, I negotiate client contracts with Hughes Network Systems, GE Spacenet, Scientific Atlanta, NEC and other satellite service providers. There will be a lot of internal meetings at these companies to develop new approaches to disaster recovery after this event. This does not mean that satellite technology — specifically VSAT technology — will not continue to be the most cost-effective means of providing reliable data services for businesses and the only way to provide broadcast-quality video service to large networks.

Peter Burke
President
Innovative Communication Solutions
Reston, Va.

The real threat

In his column "Is Sun admitting a pretender to the throne?" (May 25, page 74), Mark Gibbs asks if Microsoft is a threat to Sun's hold on the ISP market. I've been working on computers and networks for 15 years, the last eight on Sun equipment. Solaris is a great operating system (OS), but any version of Unix is a much better choice than Windows NT for ISP services. Here's why:

First, Internet culture has its roots in Unix culture — that is, open, not proprietary. Second, Microsoft repeatedly has shown that it does not play by any rules it doesn't draft itself. Internet standards be damned — if standards can't be ignored, they will be "enhanced" until they are proprietary to Microsoft and no longer interoperate seamlessly with non-Microsoft OSes.

Furthermore, Microsoft does not believe in remote administration. Because user context is married to a machine, to deal with really tough problems effectively you must be sitting at the console with a mouse.

In addition, Microsoft thinks it's OK to require a reboot for trivial configuration changes. That's OK for single-user desktops, but not for servers.

Finally, Microsoft has a reputation as a ruthless, predatory entity that ships beta-quality OSes to a customer base that blindly believes slick marketing hype. It works because most people don't know their computer science.

But if you're building an ISP, you must know your science. If you do, you already know to stay away from NT until it matures.

Mike Borowiec
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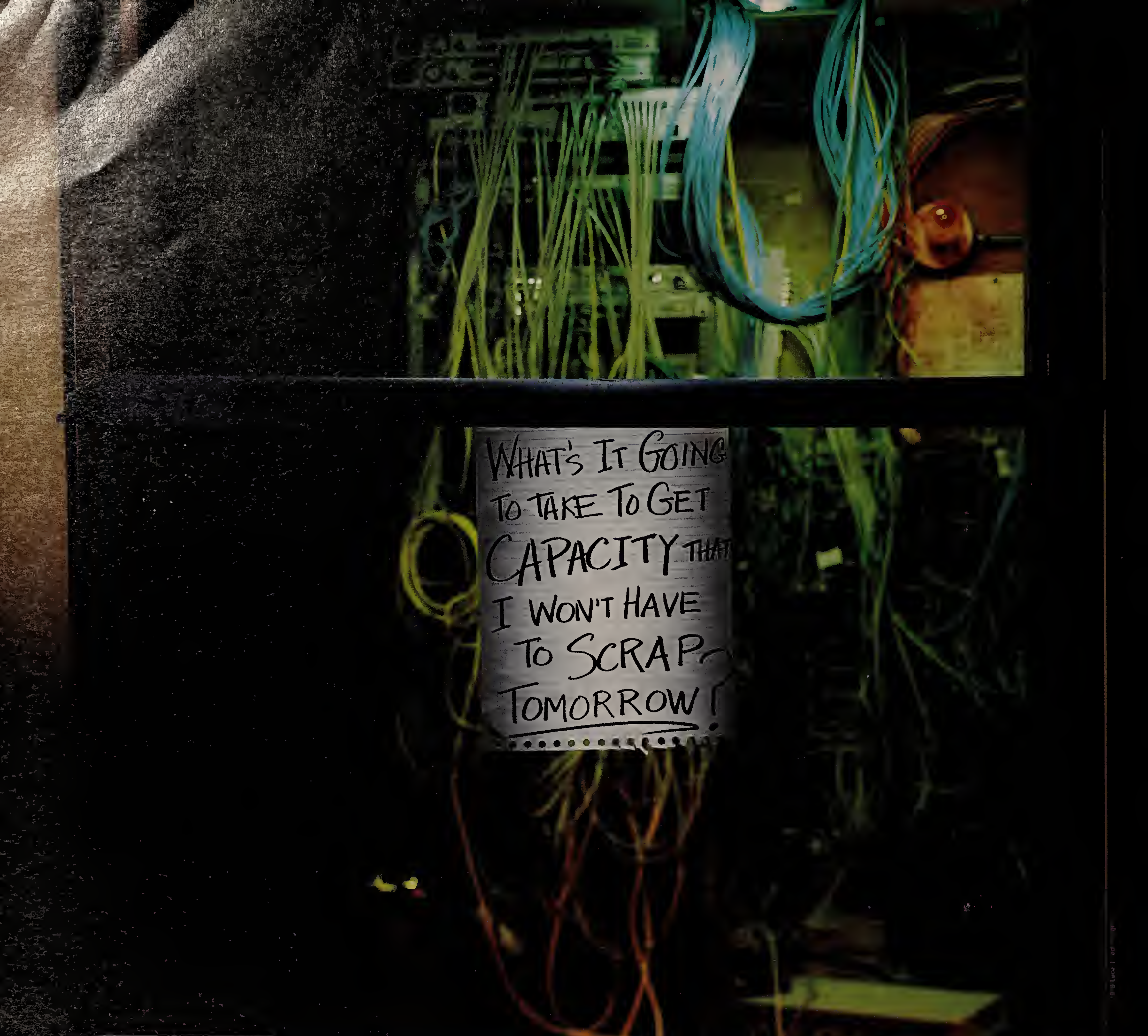

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1998 NETWORK WORLD
SERVICE AND SUPPORT SURVEY

Measuring satisfaction

Readers rate server, groupware and network hardware vendors on service and support; only three make the Honor Roll.

By Tom Duffy

Several weeks ago, Richard Nissel was almost done installing a Cisco Systems, Inc. PIX Firewall at the West Virginia state treasurer's office when the network went down. The outage brought business throughout the state government complex in Charleston to a screeching halt for more than three hours.

The problem was found after several frantic hours and numerous calls to Cisco's help desk. As it turned out, a help desk technician at Cisco misconfigured a router on the perimeter of the network, says Nissel, an automated information systems director for the state. Because of the incident, Nissel won't let workers access the routers for repair unless the technicians are on-site and tell him what they're going to do first.

Service and support is the invisible glue that binds networks. Under the best circumstances, it absorbs the stress of fractures, allowing business to continue with the fewest disruptions possible. In the worst situations, well-intentioned but faulty assistance exacerbates complex problems, fraying the nerves of overworked network managers and costing companies thousands of dollars in downtime.

Given its importance, service and support increasingly is becoming a key factor in purchase decisions. We conducted the inaugural 1998 Network World Service and Support Survey to find out which vendors do it best. Sponsored in part by Deloitte Consulting and conducted by STAT Resources, Inc., the survey shows that buyers of PC servers, groupware and internetworking hardware are mostly satisfied with their vendors' technical support. Still, with few exceptions, the results show there is plenty of room for improvement among vendors.

We mailed two individual surveys, one on servers and groupware and another on internetwork hardware, to 1,000 readers. Both surveys garnered responses from a total of 646 *Network World* readers employed in the IT field. Customers ranked their primary and secondary vendors on five principal service and support characteristics: cost, reliability, repair service, technical support and overall service and support. Not surprisingly, vendors usually scored higher among their primary customers rather than with users in general.

Respondents were then polled in more depth on their level of satisfaction with their primary vendors. Scores ranged from a possible low of 50 (not very satisfied) to a high of 100 (extremely satisfied).

We gave special Network World Honor Roll recognition to the few vendors that earned an overall satisfaction rating of 85 or more from their primary customers. Internetwork hardware vendors needed to score at least 85 in each of the switch, hub and router product categories.

NetworkWorld

HONOR ROLL

To be recognized on the Honor Roll, vendors had to earn an overall satisfaction rating of 85 or above from their primary customers. Internetwork hardware vendors needed to score at least 85 in each of the switch, hub and router product categories.

Servers: **Dell**
Groupware: **None**
Internetwork hardware: **3Com, Cisco**

The survey found the highest levels of satisfaction among customers of internetworking hardware vendors that sell switches, routers and hubs. This group notched an overall service and support score of 84, a figure nearing the upper edge of "somewhat satisfied." Server vendors were a smidgen behind, with users giving them an average rating of 83 for overall service and support.

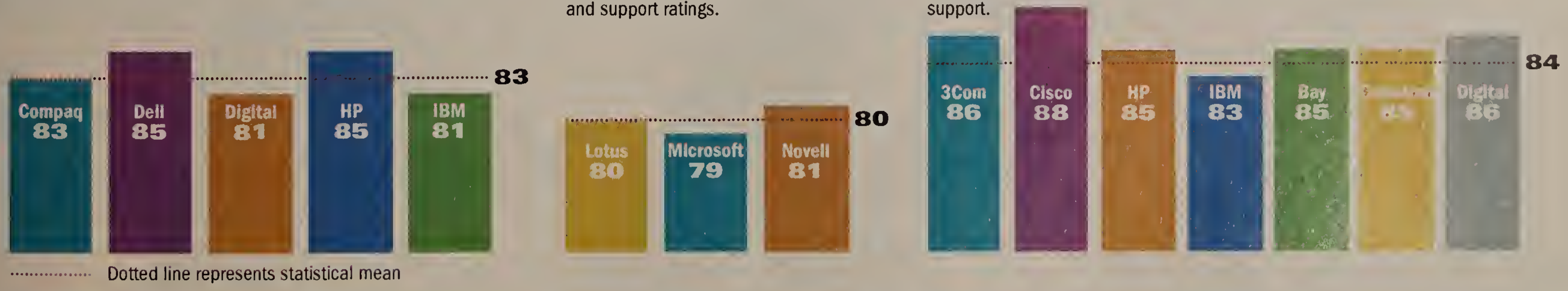
Groupware buyers, however, were less satisfied. The average overall service and support rating of 80 hits the bottom end of the "somewhat satisfied" category, which hardly indicates customers are thrilled by service levels.

None of the vendors in any of the three categories — servers, groupware and internetwork hardware — ran away from the pack, though some managed to edge out the competition. Any difference greater than 2.5 between ratings is considered statistically significant.

Continued on page 52

OVERALL SERVICE AND SUPPORT SCORES

Here's how vendors fared when users gave them a single rating for overall service and support. Differences of more than 2.5 are statistically significant.



Dell and HP won top scores from generally satisfied server buyers.

Groupware vendors garnered modest service and support ratings.

Buyers gave their internetwork hardware vendors high marks for overall service and support.

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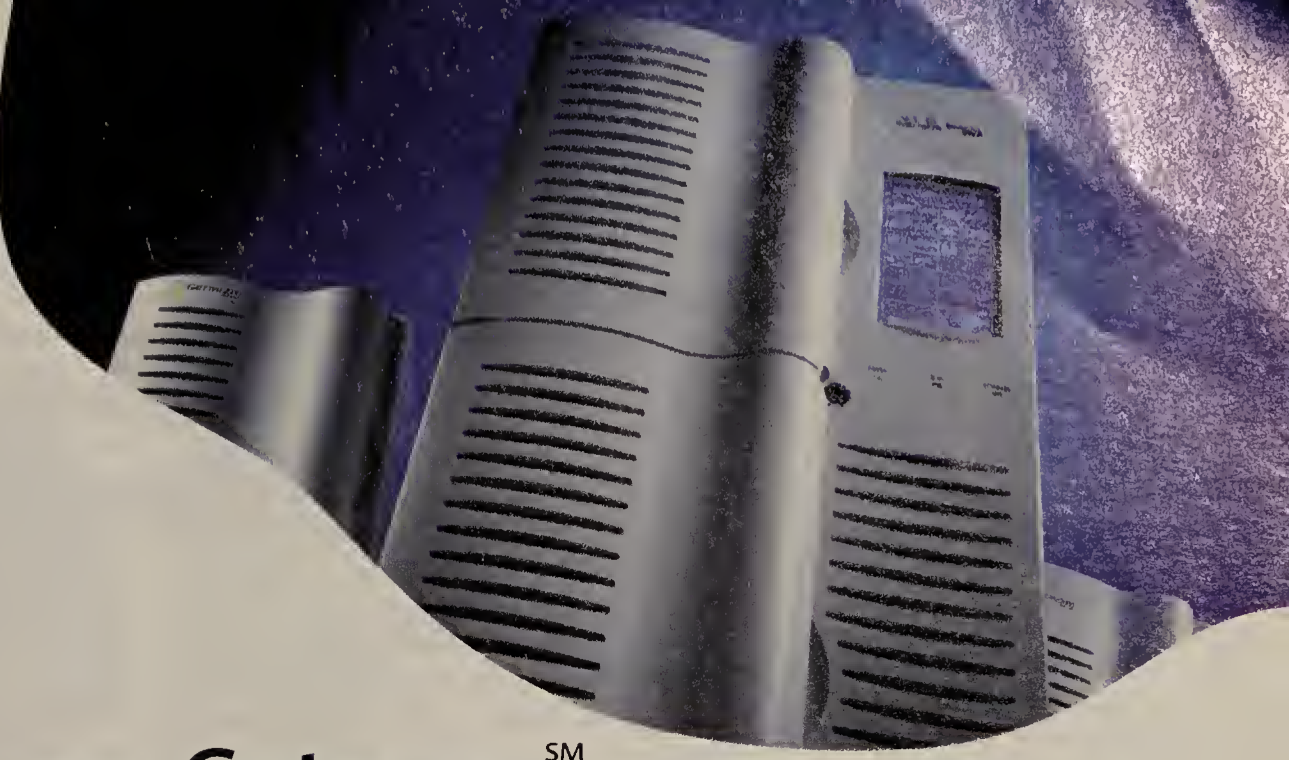

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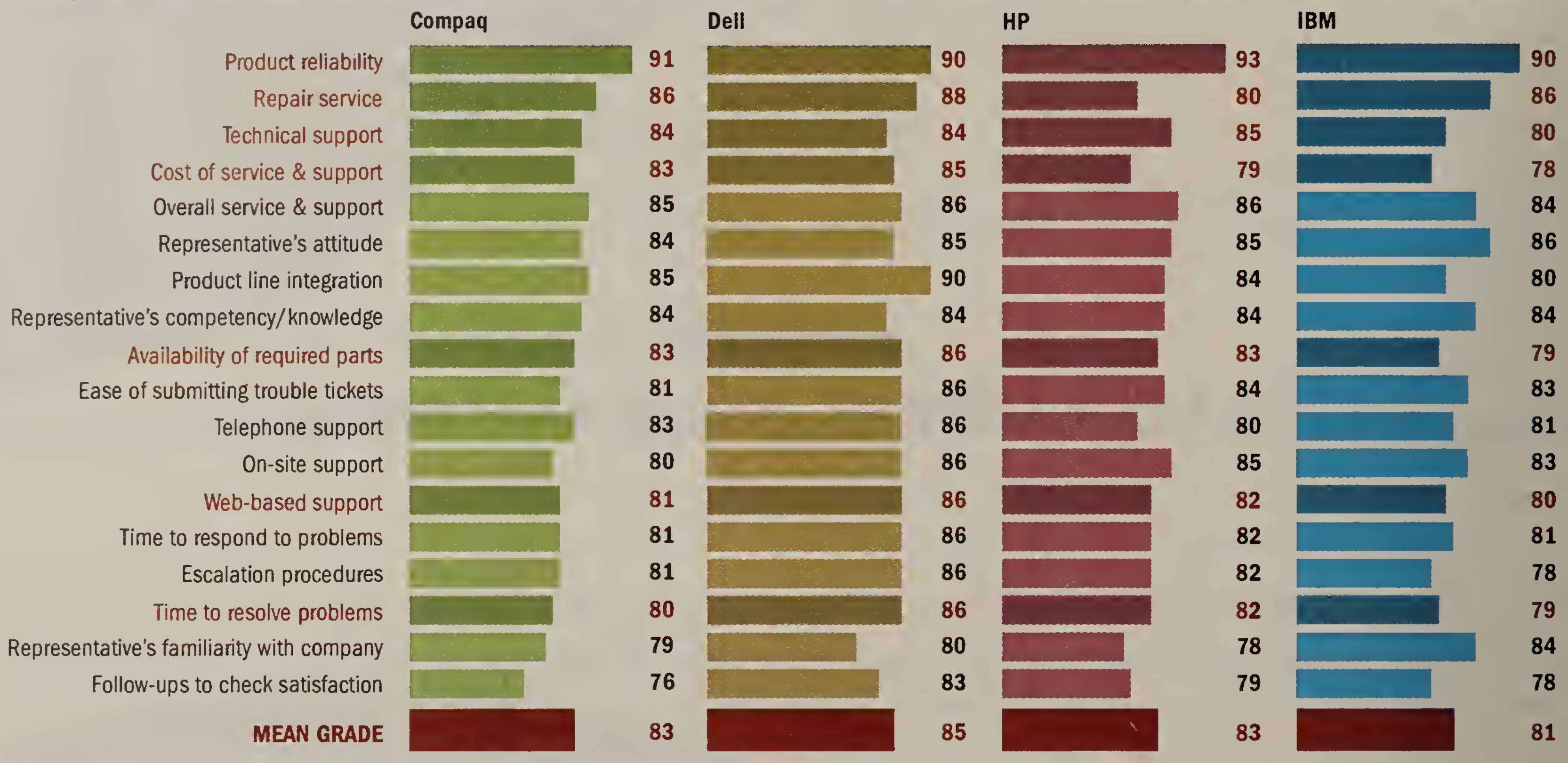
SERVER REPORT CARD

Primary users rated their vendors on these specific support attributes. We averaged each vendor's ratings to determine the mean, or overall satisfaction rating.



	Compaq	Dell	HP	IBM
Product reliability	91	90	93	90
Repair service	86	88	80	86
Technical support	84	84	85	80
Cost of service & support	83	85	79	78
Overall service & support	85	86	86	84
Representative's attitude	84	85	85	86
Product line integration	85	90	84	80
Representative's competency/knowledge	84	84	84	84
Availability of required parts	83	86	83	79
Ease of submitting trouble tickets	81	86	84	83
Telephone support	83	86	80	81
On-site support	80	86	85	83
Web-based support	81	86	82	80
Time to respond to problems	81	86	82	81
Escalation procedures	81	86	82	78
Time to resolve problems	80	86	82	79
Representative's familiarity with company	79	80	78	84
Follow-ups to check satisfaction	76	83	79	78
MEAN GRADE	83	85	83	81

The shaded ratings had the most impact on vendors' overall satisfaction grades for this product category.

David Lee, a senior manager with Deloitte Consulting in New York, is not surprised by the modest rankings. Among other things, the scores explain the growth in internal help desks and third-party knowledge bases, he says.

"The whole niche industry around service and support has been created precisely as a result of the somewhat satisfied medium rating for these vendors," Lee says.

While pinning the blame largely on vendors, Lee and others at his firm who reviewed the results say customers hold some of the responsibility for ensuring they receive adequate service and support.

"There are not a lot of companies that do a real good job of managing their vendors," says Rodney Runolfson, senior consultant at Deloitte Consulting. "Often, they don't ask the right questions and don't have clearly defined service-level agreements."

Dell leads in server satisfaction

On the server playing field, the scores of Compaq Computer Corp., Dell Computer Corp., Digital Equipment Corp., Hewlett-Packard Co. and IBM were too close to name a front-runner. As a whole, the group scored an average overall service and support rating of 83.

John Jaklitsch, a network specialist at the Pocono Medical Center in East Stroudsburg, Pa., has seen great improvements in the service provided by IBM in the past year. Jaklitsch had a problem getting software to work with an AS/400 server several weeks ago and got the problem solved almost immediately by calling IBM, even though the glitch appeared to be with the third-party software.

"I waited about 10 minutes on the phone but then someone came on and said, 'Here's what you need to do.' [The fix] worked just like he said it would," Jaklitsch recalls. "In the past, they would have said, 'You need to call the third-party vendor.'"

With the exception of Dell, server buyers as a whole were most dissatisfied with the cost of their vendors' service and support plans. Dell led the pack with a score of 85, while Compaq, HP and IBM turned in their lowest scores of the principal service and support characteristics.

The survey also queried each vendor's primary users about 13 more specific areas of the vendor's technical assistance, such as availability of required parts, Web-based support, escalation, and ease of submitting trouble tickets. Those questions elicited some differences.

Dell surpassed by a long shot the other server vendors in the areas of timely problem resolution, availability of required parts and Web-based technical support. Dell received the high scores of 86, 86 and 86, across the board.

IBM's score of 79 for availability of required parts indicates the vendor has the most improvement to make in that area. IBM also scored lower than its competitors for its support call escalation procedures. Compaq earned a marginal rating of 76 for following up with customers to see if they were satisfied with the way a problem was resolved.

Although Compaq didn't score nearly as high as Dell when it came to Web-based technical support, the vendor earned a respectable 81 and won raves from customer Todd Everett. As LAN administrator for Cutler-Hammer, Inc., a circuit breaker and electrical distribution equipment manufacturer in Pittsburgh, Everett regularly turns to Compaq's Web site to locate and download firmware upgrades and drivers for servers, video cards and network adapters.

"Compaq's Web-based support is magnificent," Everett says. "If you lose a driver, all you do is log on to their Web site, search for a driver, download it, turn on the executable, and then it creates two new diskettes exactly like the ones you lost. It's instantaneous, and I don't have to wait for anybody."

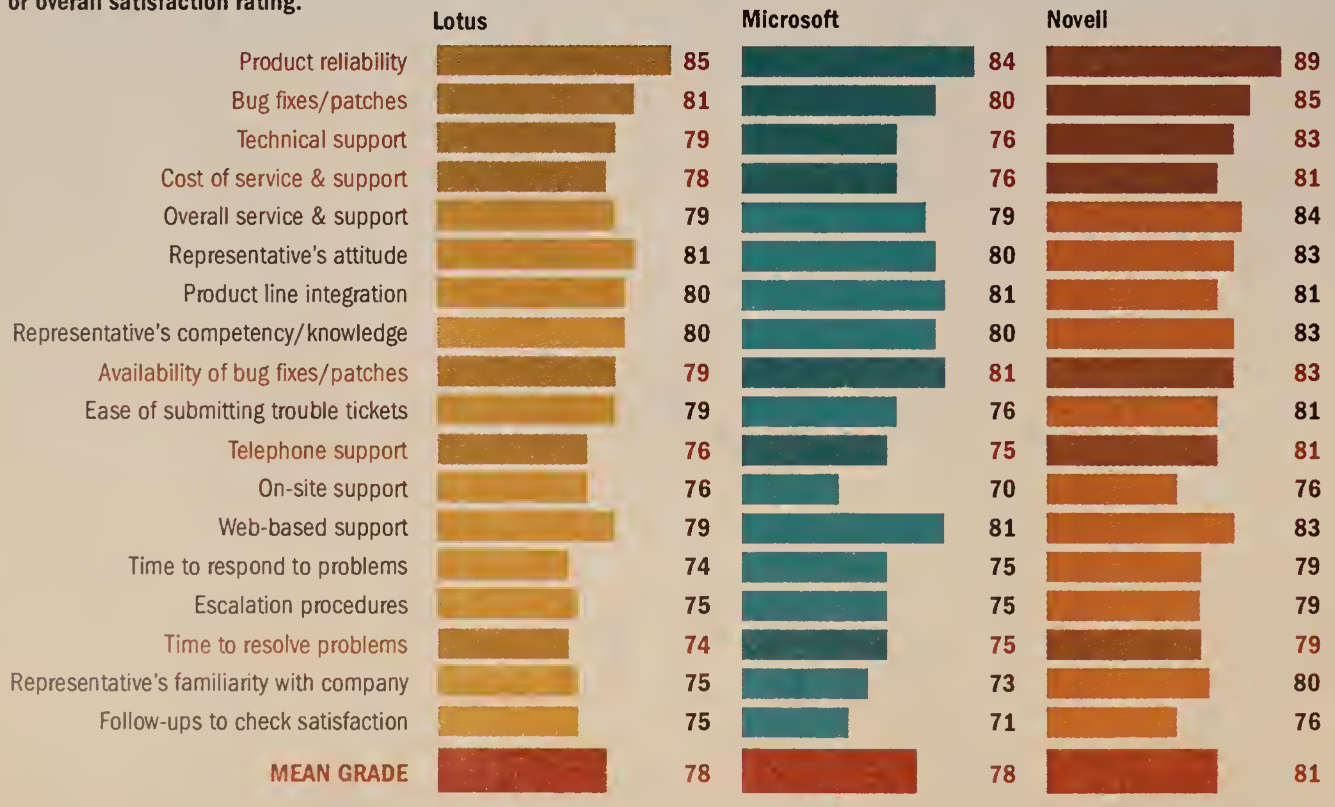
Novell grabs groupware lead

The differences between groupware vendors' ratings for overall service and support weren't significant, but Novell, Inc. was the clear leader with

Continued on page 54

GROUPWARE REPORT CARD

Primary users rated their vendors on these specific support attributes. We averaged each vendor's ratings to determine the mean, or overall satisfaction rating.



	Lotus	Microsoft	Novell
Product reliability	85	84	89
Bug fixes/patches	81	80	85
Technical support	79	76	83
Cost of service & support	78	76	81
Overall service & support	79	79	84
Representative's attitude	81	80	83
Product line integration	80	81	81
Representative's competency/knowledge	80	80	83
Availability of bug fixes/patches	79	81	83
Ease of submitting trouble tickets	79	76	81
Telephone support	76	75	81
On-site support	76	70	76
Web-based support	79	81	83
Time to respond to problems	74	75	79
Escalation procedures	75	75	79
Time to resolve problems	74	75	79
Representative's familiarity with company	75	73	80
Follow-ups to check satisfaction	75	71	76
MEAN GRADE	78	78	81

The shaded ratings had the most impact on vendors' overall satisfaction grades for this product category.

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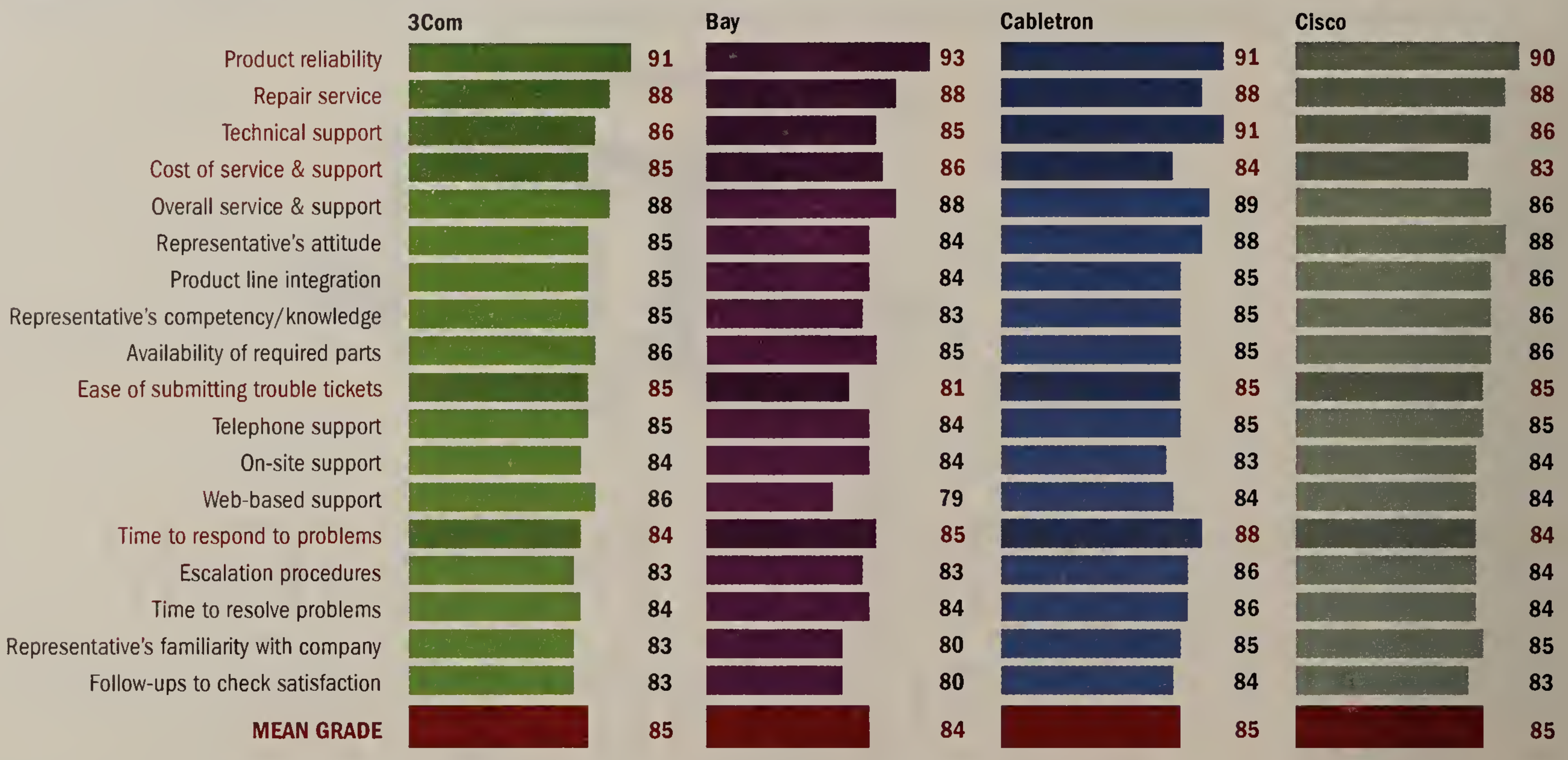
Continued from page 52

SWITCH REPORT CARD

Primary users rated their vendors on these specific support attributes. We averaged each vendor's ratings to determine the mean, or overall satisfaction rating.



The shaded ratings had the most impact on vendors' overall satisfaction grades for this product category.

an overall satisfaction rating of 81, derived from primary users' assessments of specific support attributes. Chief competitors Lotus Development Corp. and Microsoft Corp. tied with a rating of 78.

Novell topped the groupware rankings in virtually all individual categories, including the key areas of cost of service and support, bug fixes and patches, and telephone support. The vendor particularly excelled in the area of product reliability, with a score of 89, compared to 85 for Lotus and 84 for Microsoft.

The results show that all three groupware vendors need to improve their on-site support. Microsoft earned a mere 70, which also was the lowest single rating recorded in the 1998 Network World Service and Support Survey. Lotus and Novell each scored a 76. Customers also would like vendors to solve their groupware problems more quickly. Novell's mediocre rating of 79 was the highest for time to resolve problems, while Lotus earned an unimpressive 74.

Cabelas, Inc., a Sidney, Neb., mail-order house for hunting and fishing gear, uses Novell's GroupWise 5.1 e-mail for its 2,000 employees. Lyle Borcher, the company's MIS director, has nothing but good things to say about Novell's support. Although he doesn't have a lot of problems with GroupWise, Borcher says Novell supports the product as well as it does IntranetWare.

Deloitte Consulting's Runolfson says Novell's higher ratings show that in spite of being smaller than Microsoft or the combined IBM/Lotus, the vendor is winning mind share among customers.

"Providing good customer service can be a cost-effective method for increasing or maintaining your customer base," Runolfson says. "When IT decision makers find out that Novell is not the biggest company but that it provides good quality service, maybe they are going to lean in its direction."

When it comes to groupware, or any area of service and support for that matter, some customers suggest paying to upgrade from "business class" to "first class." Michael Nelkens, vice president of market data and PC support for New York-based Global Financial Markets, says that's particularly true when dealing with Microsoft, which provides his company with Premier support for Microsoft Office and Exchange.

"With regular support it takes time to solve the problems. But with Premier you can get them to make it a higher priority, and you get a faster response," Nelkens says, adding, though, that he's unsure of the additional costs involved.

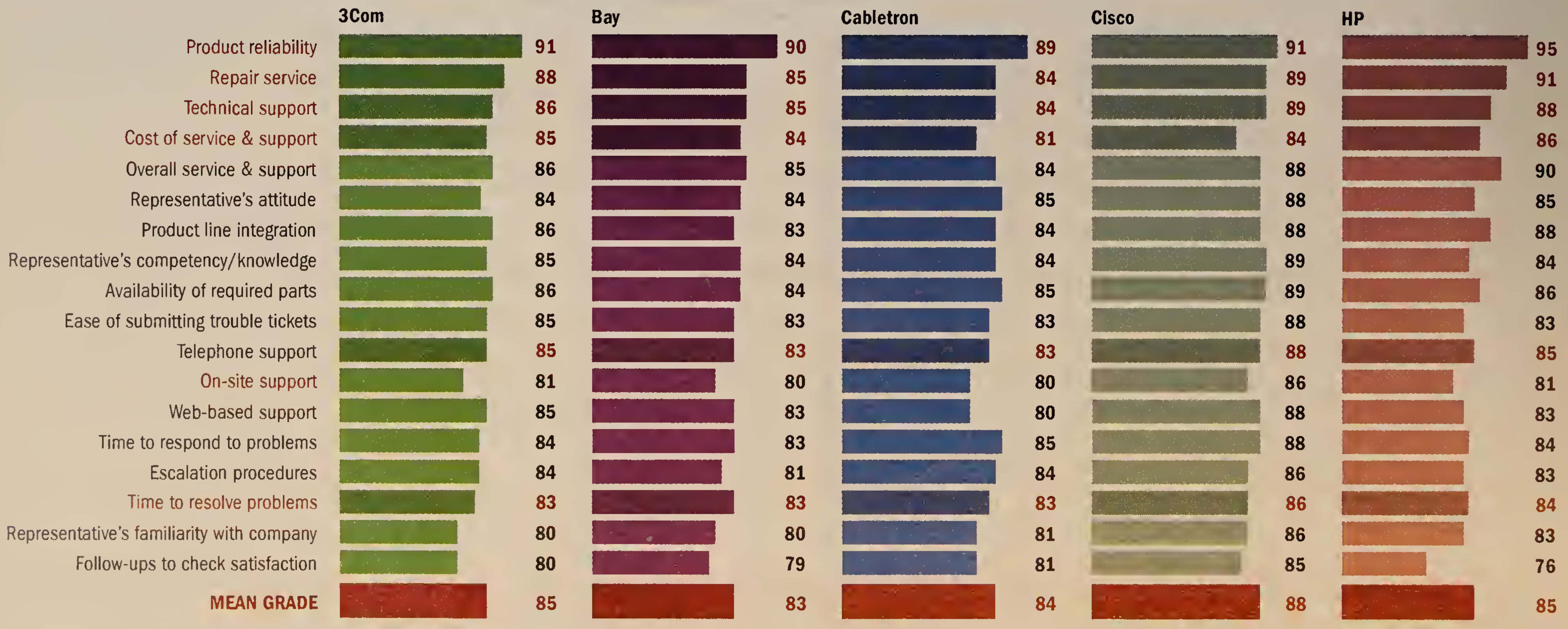
Network hardware ratings are closely huddled

Internetwork hardware fared the best compared to all other products rated in the survey,

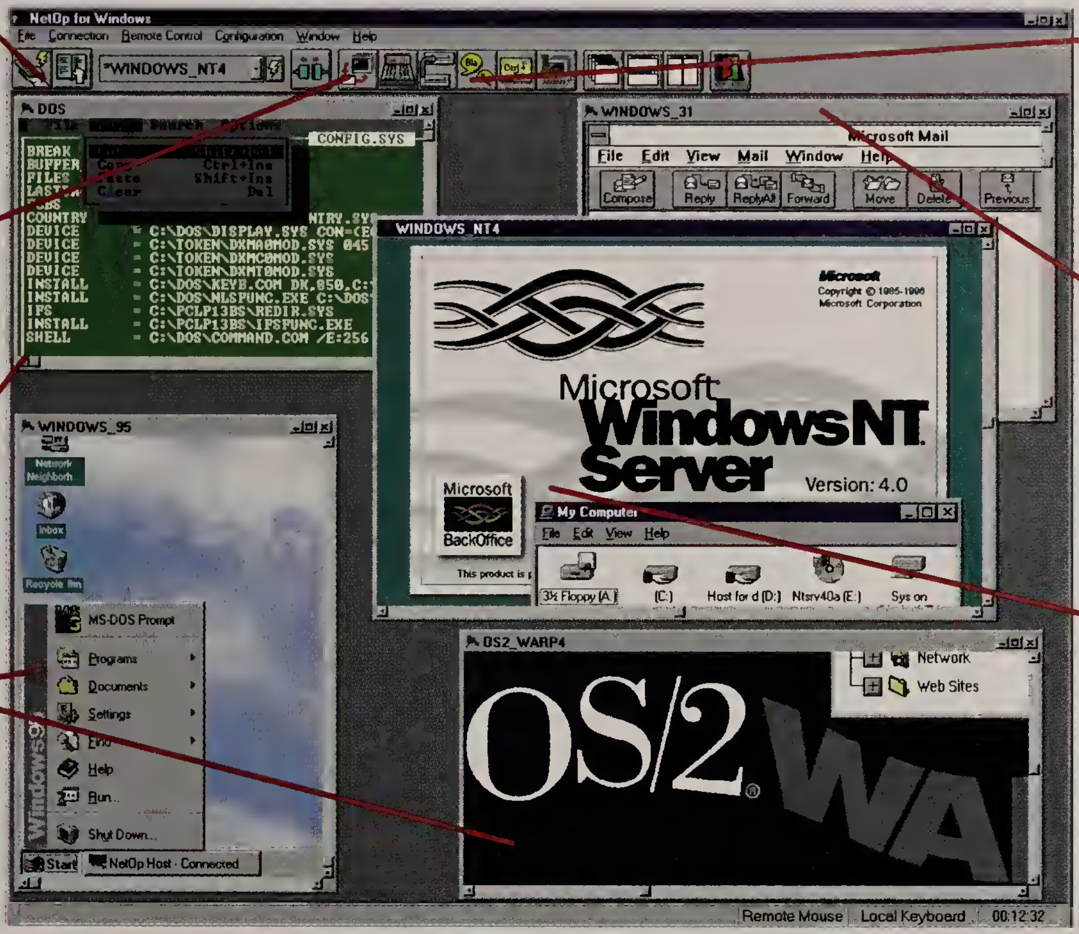
Continued on page 57

HUB REPORT CARD

Primary users rated their vendors on these specific support attributes. We averaged each vendor's ratings to determine the mean, or overall satisfaction rating.



The shaded ratings had the most impact on vendors' overall satisfaction grades for this product category.



```
BREAK
BUFFER
FILES
LAST
COUNTRY                                NTRY.SYS
DEVICE     = C:\DOS\DISPLAY.SYS CON=(E
DEVICE     = C:\TOKEN\DXMA0MOD.SYS 045
DEVICE     = C:\TOKEN\DXMC0MOD.SYS
DEVICE     = C:\TOKEN\DXMT0MOD.SYS
INSTALL    = C:\DOS\KEYB.COM DK,850,C:
INSTALL    = C:\DOS\NLSFUNC.EXE C:\DOS
IFS        = C:\PCLP13BS\REDIR.SYS
INSTALL    = C:\PCLP13BS\IFSFUNC.EXE
SHELL      = C:\DOS\COMMAND.COM /E:256
```

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WRQ is the 17th largest PC software company in the U.S. (Soft-Letter). It has offices throughout the world and distributes products in more than 50 countries through a worldwide distribution network. For more information, contact WRQ, 1500 Dexter Avenue North, Seattle, WA 98109.

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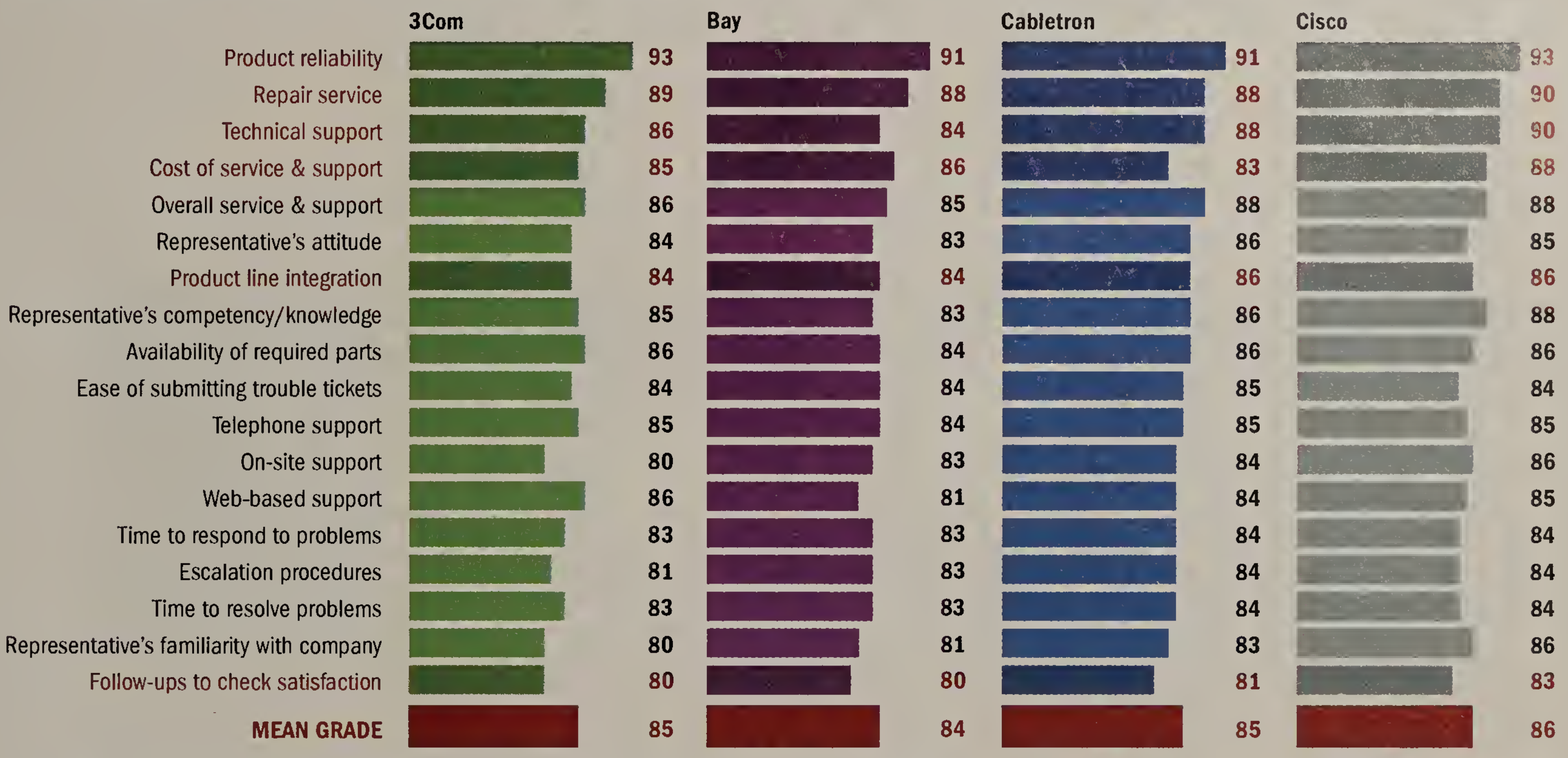
WRQ
Reflection and Express Software

Continued from page 54

ROUTER REPORT CARD

Primary users rated their vendors on these specific support attributes. We averaged each vendor's ratings to determine the mean, or overall satisfaction rating.



	3Com	Bay	Cabletron	Cisco
Product reliability	93	91	91	93
Repair service	89	88	88	90
Technical support	86	84	88	90
Cost of service & support	85	86	83	88
Overall service & support	86	85	88	88
Representative's attitude	84	83	86	85
Product line integration	84	84	86	86
Representative's competency/knowledge	85	83	86	88
Availability of required parts	86	84	86	86
Ease of submitting trouble tickets	84	84	85	84
Telephone support	85	84	85	85
On-site support	80	83	84	86
Web-based support	86	81	84	85
Time to respond to problems	83	83	84	84
Escalation procedures	81	83	84	84
Time to resolve problems	83	83	84	84
Representative's familiarity with company	80	81	83	86
Follow-ups to check satisfaction	80	80	81	83
MEAN GRADE	85	84	85	86

The shaded ratings had the most impact on vendors' overall satisfaction grades for this product category.

though few results significantly differed among vendors. 3Com Corp., Bay Networks, Inc., Cabletron Systems, Inc. and Cisco all had closely matched high marks for overall service and support of internetwork hardware in general, while IBM had the lowest score, 83.

Primary customers were happy with their switches. Vendors' overall satisfaction ratings were too close to be significant, but the product category as a whole earned an average overall satisfaction rating of 85.

Switch buyers were particularly pleased with product reliability, giving all vendors impressive scores in the low 90s. Perhaps all four vendors tied with identical scores of 88 for repair service because it was so infrequently needed.

Cabletron aced the competition when it came to technical support. Pulling in a 91, Cabletron scored five to six points ahead of its competitors. Cabletron was also tops for promptly responding to problems, with a score of 88, which positively impacted the vendor's overall satisfaction rating.

Steven Boudreau, manager of network services for the Rhode Island School of Design in Providence, likes the customized maintenance program Cabletron designed for him. The program assigns different levels of technical support to devices, depending on their importance to the network.

His 35 100M bit/sec Ethernet backbone switches are covered under the Parts Express program, through which Cabletron provides an on-site technician and replacement parts within four hours, 24 hours a day. Meanwhile, items that aren't as critical, such as the dozen or so workgroup switches on the network, are covered under a separate portion of the program that promises replacement or repair by the next business day.

"I'm very pleased with their support," Boudreau says. "It makes sense to have Parts Express on mission-critical pieces, but why pay the premium on an old Ethernet repeater? For that, the program would have [cost] more than the item itself." Although Boudreau declined to discuss specific costs of the program, he says it's cost-effective for the school.

Boudreau first took advantage of Parts Express about a month ago, when a switch appeared to have failed. "Within three hours, I had a new 100M bit/sec switch," he says. "It turned out it wasn't a hardware problem but a software configuration issue. But still, there were no questions asked. It was terrific."

HP joined the big four internetwork hardware vendors at the hub party and came home with the best overall service and support score. HP also pulled off a close victory in three hub support categories: cost of service and support, repair service and product reliability. Indeed, HP scored a whopping 95 in the latter category, the highest score recorded in the entire survey.

KEN GABRIELSEN

John Jaklitsch, *a networking specialist at the Pocono Medical Center in East Stroudsburg, Pa., says IBM came through for him and fixed a problem with third-party software.*

At North American Products Corp. in Jackson, Ind., 10 HP 24TX AdvanceStack hubs are key components of the LAN that serves the 150 employees of the commercial cutting tool manufacturer and distributor. James Gatwood, North American's IS director, says the firm started two years ago with eight 10M bit/sec Ethernet hubs and recently added a pair of 100M bit/sec hubs to the network, which primarily handles administrative, bookkeeping and e-mail functions.

"It's definitely a case of 'put 'em in and they

Survey methodology

Go online for more Service and Support Survey results – you'll find more stats, facts and figures.

FIND IT ON FUSION 7421

www.nwfusion.com

STAT Resources, Inc., a leading international strategic marketing research firm, mailed surveys to 2,000 *Network World* readers. Respondents were pulled from a random list of readers who work in various industries, including manufacturing/process, finance/insurance, service, education, government, transportation.

We sent two different questionnaires to 1,000 people each. Of that 2,000, 646 responded, for an overall response rate of 32%. The response rate for servers and groupware was 30%, while the response rate for internetwork hardware was 35%.

Ratings originally were measured on a scale from 1 to 5. Network World converted the ratings to a scale ranging from 50 to 100, with 100 being a perfect score. The conversion was made in order to make the numbers easier for readers to comprehend.

Thus, 5.0 means "extremely satisfied" and equates to 100, while the lowest possible score of 1.0 means "not at all satisfied" and equates to 50.

Scores were rounded to the nearest whole number. Any difference greater than 2.5 is considered statistically significant.

Deloitte Consulting

Deloitte Consulting, the sponsor of this year's Service and Support Survey, is one of the world's leading management consulting firms. Its networking practice focuses on applying telecommunications solutions and expertise that meet today's business challenges. The firm has networking centers of expertise in 15 offices around the world.

FIND IT ON FUSION 7522

go,'" he says. "I haven't had a lick of trouble out of them."

However, Cisco beat its competitors in practically every support attribute rated by primary hub customers, earning an overall satisfaction rating of 88. Cisco earned high scores of 89 for support representatives' competency and availability of required parts, while Bay's scores were at the back of the pack for several hub support categories.

Meanwhile, Cabletron's hubs didn't do as well among the vendor's primary customers as it did with switch buyers. The company's 81 for cost of service and support was the lowest among hub vendors, as was its 80 for Web-based technical support.

These weaknesses aren't apparent to Roman Hryniszak, a network operator for the Los Angeles Unified School District. The district uses about 30 Cabletron hubs to help tie together a network used by students, teachers and administrators in an 11-school segment of the district known as the Bell Cluster. "All the hubs do is work, and that's it," Hryniszak says.

While Cisco dominated the router category in terms of market share with 58%, it only narrowly edged its main competitors — 3Com and Bay — in the rating of overall service and support. The ratings for many support attributes were too similar to be considered significant.

In a sign that its competitors are using pricing as a way of trolling for market share, Cisco scored marginally lower than its chief router competition on cost of service and support. Bay earned the high score of 86, while Cisco scored an 83 for support pricing. However, primary Cisco customers gave the vendor an 88 for technical support in comparison to Bay's 84.

3Com won accolades for product reliability and repair service, scoring top marks of 93 and 89.

Nissel, of the West Virginia state treasurer's office, is generally happy with Cisco's customer support, but he's learned a few lessons from his experience with the router configuration mishap. Among other things, it highlighted the need to deal with technicians who have a good understanding of the whole network, not just the particular piece on which they might be working. In that particular case, the technician who usually works on the network had been called away to another job before the work was complete and didn't return, he says.

RIC EVANS

Todd Everett, *a LAN administrator for Cutler-Hammer, regularly relies on Compaq's Web-site for drivers and firmware upgrades.*

But Nissel also concedes he might have goofed by allowing someone who was unfamiliar with the network to fiddle with a router. He now makes sure his employees know when to tell vendors' technical support representatives not to do something, he says.

A spokesman for Cisco says the company did its best under the circumstances but acknowledges that in the world of service and support, sometimes things just go wrong.

"We pride ourselves on giving customers excellent service," says Robert Michelet, Cisco's director of corporate relations in San Jose, Calif. "Anytime somebody gets something other than that, we're obviously really disappointed."

Duffy is a freelance writer in Somerville, Mass. He can be reached at tduffy62@compuserve.com.

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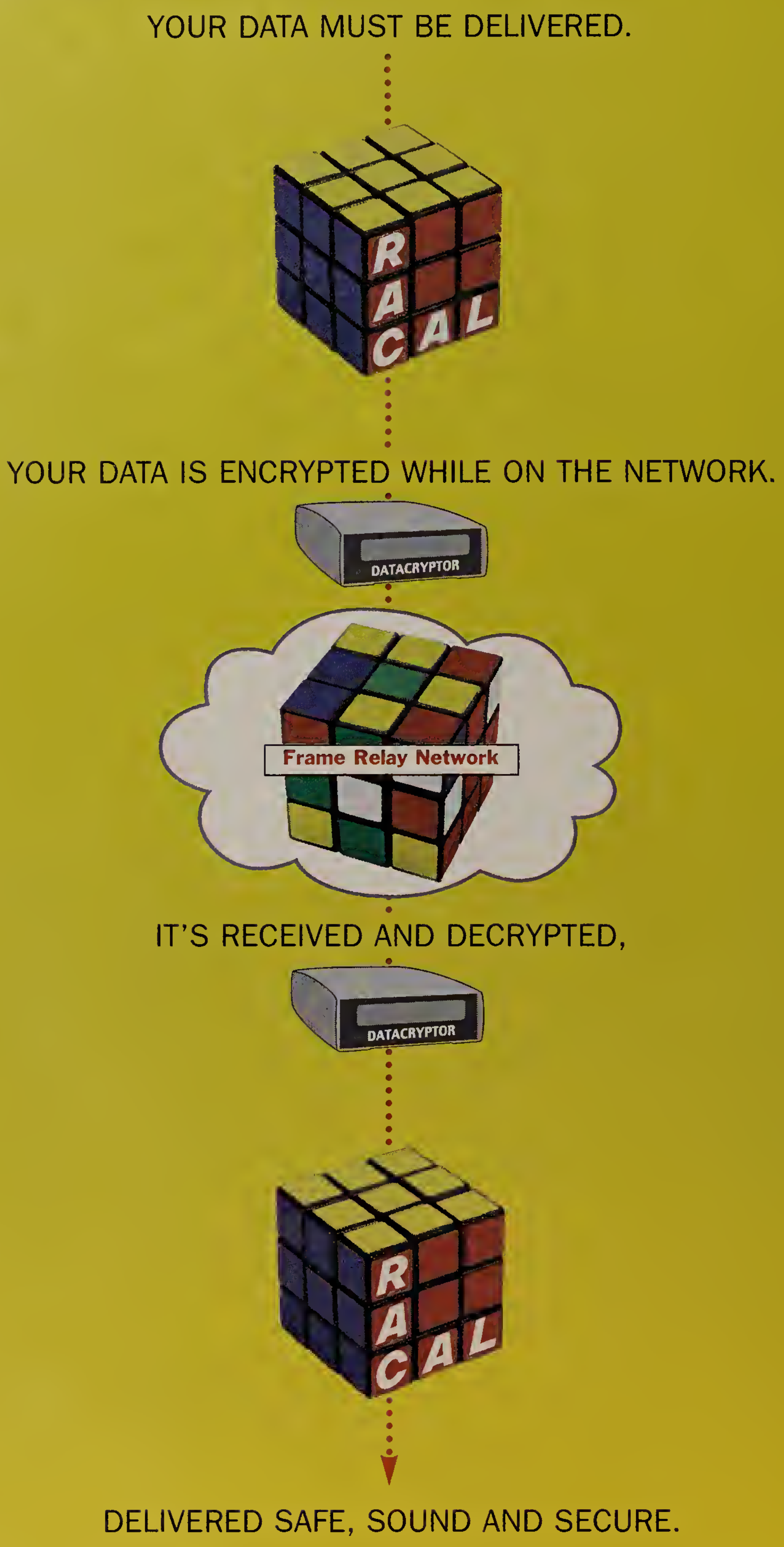

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SERVER TEST SERIES

WORKGROUP
SERVERS

Pentium II power for servers

The first servers with Intel's latest generation CPU all show good performance, but price and serviceability vary.

By John Bass

With workgroup servers, a good price/performance ratio is the key to success; reliability and bleeding-edge performance often take a back seat. Still, each of these workgroup servers, all equipped with two Intel Corp. Pentium II processors, turned in impressive results. Micron Electronics, Inc.'s Micron NetFRAME LV2000 won the performance prize despite its lower speed CPU, beating out Dell Computer Corp.'s Dell PowerEdge 2300 and NEC Computer Systems' NEC Express5800 LS2400 with their superfast 400-MHz Pentium IIs. However, there was only a slight difference in performance between the best and the worst of this group.

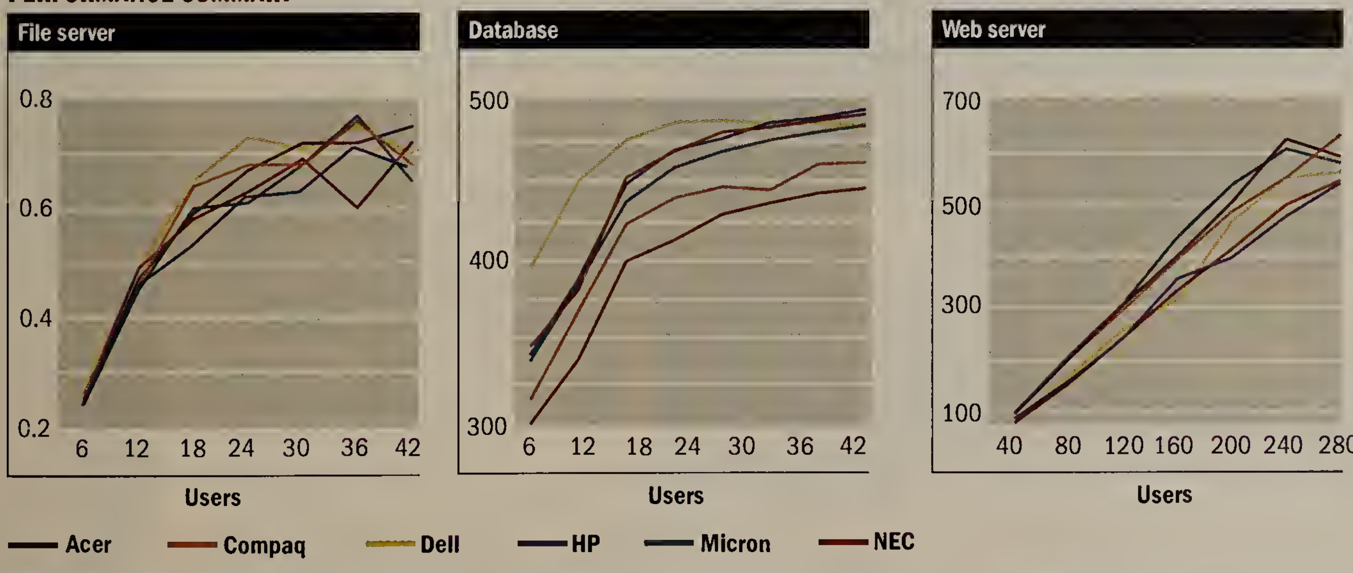
Review our test methodology and see the numbers behind the graphs on Network World Fusion.
7536
NetworkWorld Fusion
www.nwfusion.com

In our latest round of tests, file server performance differed only slightly among servers, with Dell's PowerEdge 2300 edging the pack. Web server tests showed a bit more of a difference, with Micron's NetFRAME LV2000 on top. The SQL database tests, however, showed noticeable differences among the servers, with Hewlett-Packard Co.'s NetServer LC II beating the others.

Though priced at less than $13,000 each, these are state-of-the-art systems. All the servers we tested shipped with two Pentium II processors with clock speeds ranging from 300 MHz to 400 MHz, 128M bytes of memory, a disk subsystem of the vendor's choice and a 100M bit/sec Ethernet interface card. All disk controllers utilized UltraWide SCSI technology, and some disk subsystems had RAID controllers.

Beginning in this issue, we've changed the way we conduct server testing. Our tests still aim to highlight the main subsystems of each server — the file system, CPU and network I/O — and still do so by simulating real applications. However, we're now using commercial tools to create the traffic each server has to handle. For complete details, go to Network World Fusion.

PERFORMANCE SUMMARY



File server: We use Dynameasure File Professional 2.0 to copy several file types (binary, text, image, compressed binary, compressed text and compressed image) to and from the server. We start with six users and increase by six users with each iteration until we reach 42 users. Results are measured in transactions per second.

Database: We use Dynameasure SQL Professional 2.0 to perform simulated order entry tasks employing indexed read transactions with two- and three-table joins that return a small number of rows. We start with six users and increasing by six with each iteration until we reach 42 users. Results are measured in transactions per second.

Web server: We use LoadRunner to simulate a user surfing a Web site, gathering HTML text and image data. We start with 40 users and increase by 40 with each iteration until we reach 280 users. Results are measured in K bytes per second.

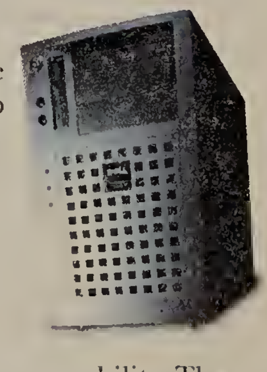
DELL POWEREDGE 2300

NetworkWorld World Class

Vendor: Dell Computer Corp.
Contact: (800) 999-3355
www.dell.com/products/poweredge/pe2300

Total score	**9.2**
Performance **(30%)**	9 x .30 = 2.7
Features and flexibility **(30%)**	9 x .30 = 2.7
Manageability **(20%)**	9 x .20 = 1.8
Serviceability **(20%)**	10 x .20 = 2.0

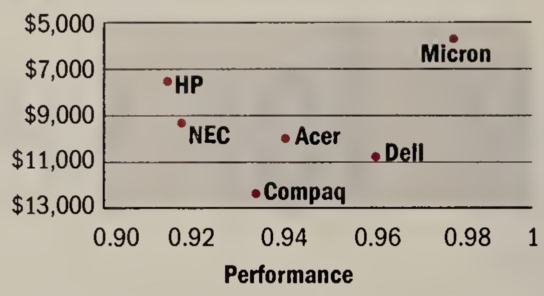
Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.



Dell's PowerEdge 2300 came out near the top in overall performance and first in overall score, thanks to its strong showing in serviceability, features, flexibility and manageability. The PowerEdge 2300 and NEC's Ex-

PRICE/PERFORMANCE COMPARISON

Micron's NetFRAME LV2000 is a clear winner in both price and performance.



Servers with the best blend of price and performance appear closest to the upper right. Performance ratings are a unitless number derived by combining NetWare and Windows NT results. We weight the file and SQL tests at 35% each, and the Web tests at 30%, to yield the overall performance value.

Note: The HP server price does not include the cost of a network operating system

press5800 LS2400 are the first servers we've seen with Intel's most powerful processor, the 400-MHz Pentium II. With strong ratings in all categories, the PowerEdge 2300 wins our World Class award.

One of the strongest points of serviceability for the Dell server is that it can be disassembled without any tools. The drives are in hot-swap bays, the processors are secured with thumb screws, the cards are secured with plastic flip tabs instead of screws, and the case can be opened with thumb screws. These features earned it the highest rating for serviceability.

Dell packages its management tools into a bundle called Dell OpenManage. It consists of four components: Server Console, which allows administrators to manage the PowerEdge server from another PowerEdge server; Client Administrator, which allows administrators to communicate with Desktop Management Interface Version 2.0-compliant hardware; Hardware Instrumentation Pack, a software package that works with certain components of server hardware to allow simpler management of Windows NT and NetWare servers; and Remote Assistant, which enables you to administer the server from remote locations.

The management software has hooks, called OpenManage Connections, to integrate the PowerEdge 2300 into Tivoli Systems, Inc.'s TME, HP's OpenView Network Node Manager (NNM) for Solaris, and IBM's NetView for AIX, and Windows NT. The server also supports automatic reboot.

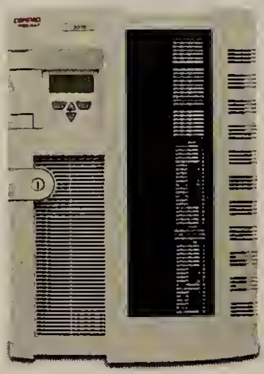
COMPAQ PROLIANT 3000

Vendor: Compaq Computer Corp.
Contact: (800) 888-0220
www.compaq.com/products/servers/proliant3000

Total score	**8.7**
Performance **(30%)**	8 x .30 = 2.4
Features and flexibility **(30%)**	9 x .30 = 2.7
Manageability **(20%)**	9 x .20 = 1.8
Serviceability **(20%)**	9 x .20 = 1.8

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

In contrast to Dell's server, the Compaq Computer Corp. ProLiant 3000 did not rank high in performance testing, but its strong serviceability and manageability features gave it a push to second overall among the servers that we tested.



The ProLiant's case has a hot-swap drive bay system capable of housing eight 1-inch drives or six 1.6-inch drives. The case is also convertible to a seven-unit rack-mounting frame. It has 12 dual in-line memory module(DIMM)RAM slots — enough to support a prodigious 3G bytes of RAM. A dual-channel UltraWide SCSI controller is included in the package.

The case supports two hot-swappable redundant power supplies, though our test system had only one installed. There's room for a redundant system fan as well. With the addition of a second network interface card (NIC), network connection failover is available.

The server has a front panel display for system management information. In the event of hardware failure, the server can automatically reboot and page the administrator. For remote access, the unit includes an internal remote console to monitor and control the server via modem access.

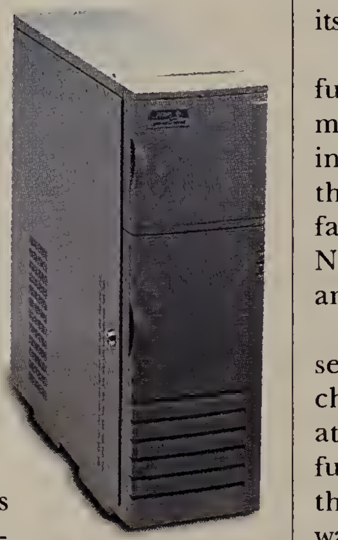
Also included is Compaq Insight Manager, an application that helps you anticipate server hardware failure, and Smart Start, which automates system configuration and operating system installation.

ACERALTOS 9100

Vendor: Acer America Corp.
Contact: (800) 773-2237
www.acer.com/aac/products/a_altos/9100.htm

Total score	**8.2**
Performance **(30%)**	8 x .30 = 2.4
Features and flexibility **(30%)**	8 x .30 = 2.4
Manageability **(20%)**	9 x .20 = 1.8
Serviceability **(20%)**	8 x .20 = 1.6

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.



Acer America Corp.'s AcerAltos 9100 placed solidly in the middle of the pack in performance and features.

The case is equipped with eight 1-inch hot-swappable hard drive slots and two redundant power supply slots, with ample space to access the motherboard for easy maintenance. The front panel can be locked to secure the case and hot-swap bay areas.

Included with the server is:

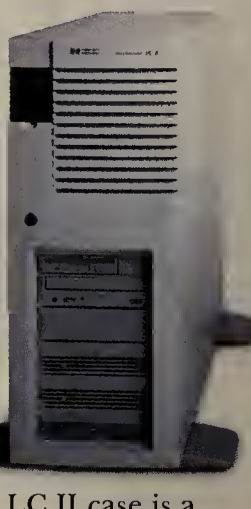
- Acer StartUp Kit, which includes drivers and automated installation of SCO OpenServer and NetWare 4.11. A resource CD-ROM includes online documentation.
- Remote Diagnostic Manager, which allows an administrator to access diagnostics via modem. The product lets you perform remote resets, view the boot process, change BIOS information and set automatic server reboots.
- Advanced Server Manager Pro, an SNMP manager with an agent for Windows NT, SCO OpenServer and NetWare. With Manager Pro, you can monitor the server's temperature, case fan, system voltages, and bus and processor utilization.

NETSERVER LC II

Vendor: Hewlett-Packard Co.
Contact: (800) 752-0900
www.hp.com/netserver/products/lc2

Total score	**8.0**
Performance **(30%)**	8 x .30 = 2.4
Features and flexibility **(30%)**	8 x .30 = 2.4
Manageability **(20%)**	8 x .20 = 1.6
Serviceability **(20%)**	8 x .20 = 1.6

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.



HP's NetServer LC II placed third in overall score. It rated last in overall performance, but first in SQL testing. Its easy-to-service case and wealth of management features helped boost its standing.

The NetServer LC II case is a full tower design with a rack-mount option. The hard drive bays include one fixed drive bay and three hot-swappable bays. NIC failover is available with a second NIC. There are key locks for drive and case access.

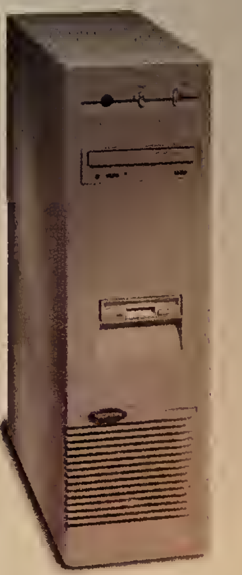
The server features automatic server reboot to restart the machine in the event of an operating system lockup. It also offers full remote control features through a combination of hardware, firmware and software. HP's TopTools software package is included to allow an administrator to control and monitor the server's operation.

MICRON NETFRAME LV2000

Vendor: Micron Electronics, Inc.
Contact: (800) 209-9686
www.micronpc.com/products/netframe/lv2000

Total score	**7.6**
Performance **(30%)**	9 x .30 = 2.7
Features and flexibility **(30%)**	7 x .30 = 2.1
Manageability **(20%)**	8 x .20 = 1.6
Serviceability **(20%)**	6 x .20 = 1.2

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.



Micron's NetFRAME LV2000 came in fifth overall, but first in Web testing and overall performance. The LV2000's downfall was a lack of features and relatively poor serviceability. However, considering its sub-$6,000 price, which is less than half that of the Compaq ProLiant 3000, the most expensive server in this roundup, the LV2000 delivers a lot of performance for the dollar.

The LV2000's case is plain in

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appearance with no hot-swappable hard drive bays. The case is a simple PC-like design with no removable modules, hinged covers or removable drives.

The server comes with Intel's LANDesk Server Manager to monitor fan failure, processor voltage and processor temperature. An automatic server reboot feature is included as well. A Country Kit CD-ROM allows for automatic setup of the server.

NEC EXPRESS5800 LS2400

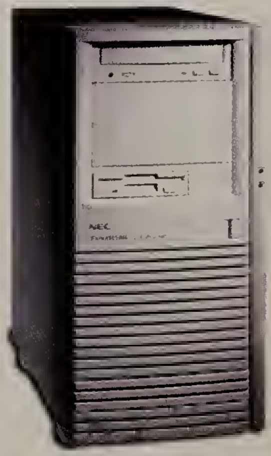
Vendor: NEC Computer Systems Division, Packard Bell NEC, Inc.
Contact: (888) 863-2669
www.neccomputers.com/products/servers/express_ls2400.html

Total score	**7.2**
Performance **(30%)**	8 x .30 = 2.4
Features and flexibility **(30%)**	6 x .30 = 1.8
Manageability **(20%)**	9 x .20 = 1.8
Serviceability **(20%)**	6 x .20 = 1.2

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

The NEC Express5800 LS2400 placed last in the ratings but third in overall performance testing, thanks no doubt to its speedy 400-MHz Pentium II processor.

Like the Micron server, the NEC lacks convenient serviceability features. The server's case is simple with four fixed drive bays. The case is a mid-tower configuration with an available five-unit rack-mount kit.



The case is very much like a run-of-the-mill PC, with no hinged covers, removable drives or slide-out components. The LS2400 comes with ESMPRO management software to monitor server performance and to configure server subsystems remotely over the LAN or via a Web server. It's also bundled with ExpressBuilder installation software.

A second Ethernet interface card can be configured in the system to provide load balancing and failover features.

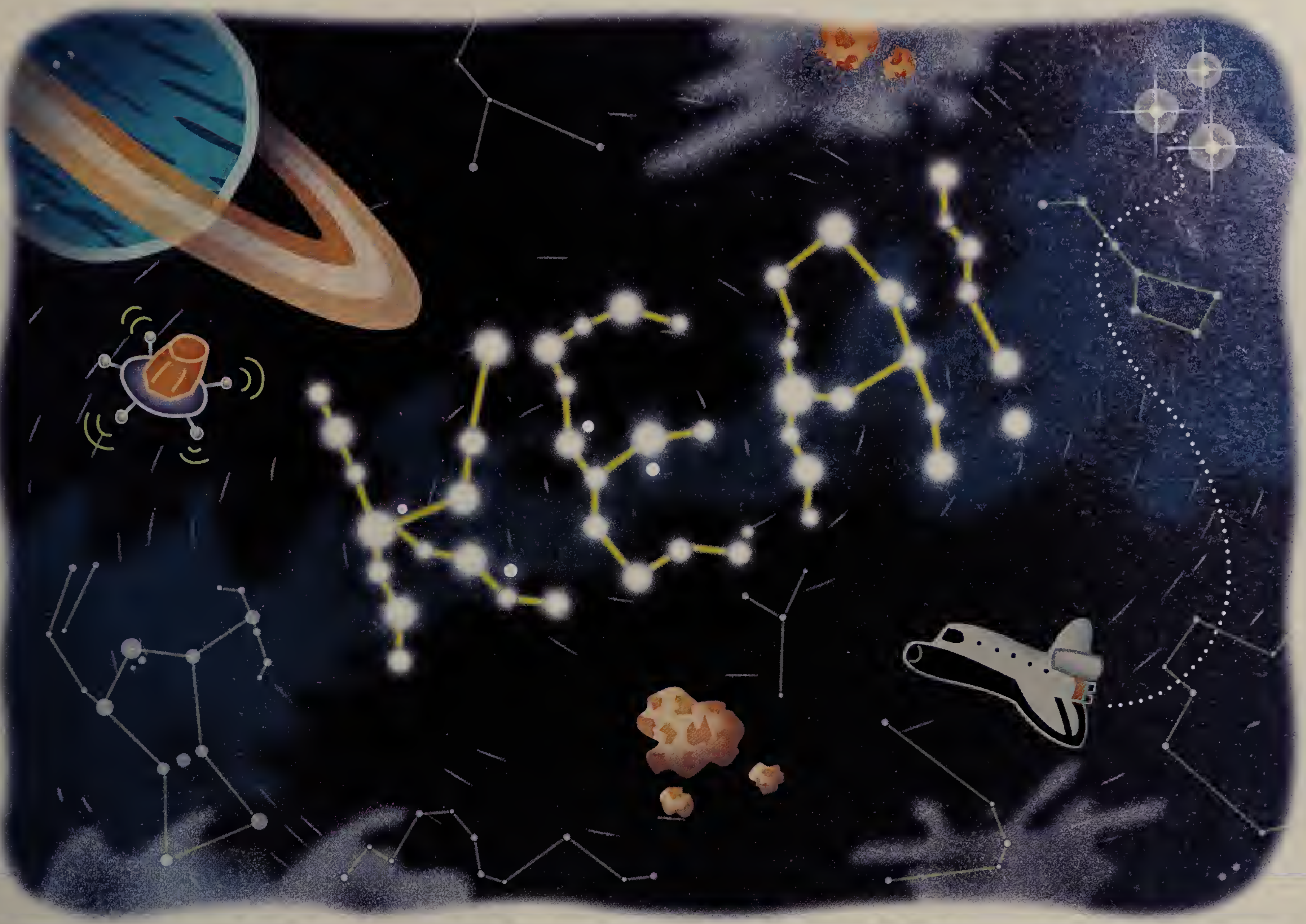
The LS2400 is a decent server but lacks any features that make it stand out in a crowd.

Our server testing is performed at North Carolina State University's Centennial Networking Labs (CNL) in Raleigh. CNL tests network equipment and network-attached devices for interoperability and performance.

Bass, a senior technical staff member at CNL, designs and leads the execution of the test suites. He can be reached at john_bass@ncsu.edu. Kris Kiser and Tom Elliot assisted.

WORKGROUP SERVERS: THE INSIDE STORY

Server	**Dell PowerEdge 2300**	**Compaq ProLiant 3000**	**AcerAltos 9100**	**NetServer LC II**	**Micron NetFRAME LV2000**	**NEC Express5800 LS2400**
Vendor	**Dell Computer Corp.**	**Compaq Computer Corp.**	**Acer America Corp.**	**Hewlett-Packard Co.**	**Micron Electronics, Inc.**	**NEC Computer Systems**
Price	$10,738	$12,315	$10,044	$7,715 w/o OS	$5,897	$9,473
Processor type	400-MHz Pentium II	333-MHz Pentium II	300-MHz Pentium II	300-MHz Pentium II	300-MHz Pentium II	400-MHz Pentium II
# of processors	2	2	2	2	2	2
# of processors supported	2	2	2	2	2	2
Memory configuration	(1) 128M bytes ECC SDRAM DIMM	(2) 64M bytes ECC EDO DIMMs	(2) 64M bytes ECC EDO DIMMs	(1) 128M bytes ECC EDO DIMM	(2) 64M bytes ECC EDO DIMMs	(4) 32M bytes ECC EDO DIMMs
# and type of RAM slots	4 DIMM	12 DIMM	4 DIMM	4 DIMM	4 DIMM	4 DIMM
Expansion slots present	4 PCI 2 PCI/ISA	5 PCI 3 PCI/EISA 2 PCI controllers, no PCI bridge	4 PCI 1 PCI/EISA 2 ISA	5 PCI 1 PCI/ISA	4 PCI 1 ISA	3 PCI 1 ISA 1 PCI/ISA
Expansion slots available	3 PCI 2 PCI/ISA	3 PCI 3 PCI/EISA	3 PCI 1 PCI/EISA 2 ISA	4 PCI 1 PCI/ISA	3 PCI 1 ISA	3 PCI 1 ISA 1 PCI/ISA
Disk controller	UltraNarrow SCSI, RAID Level 0 UltraWide SCSI array controller	Dual UltraWide SCSI Compaq SmartSL array controller	Mylex RAID controller, Adaptec 7880 UltraWide SCSI controller on motherboard	UltraWide SCSI	AAA-132 RAID Controller, Adaptec 7880 UltraWide SCSI controller on motherboard	Dual UltraWide SCSI controller on motherboard
HD description	(4) 4.55G-byte Seagate UltraWide SCSI 10,000 rpm	(4) 4.3G-byte Seagate Cheetah UltraWide SCSI 10,000 rpm	(2) 4.5G-byte IBM DDRS-34560 UltraWide SCSI 7,200 rpm	(4) 4.2G-byte HP D3583-60003 UltraWide SCSI 7,200 rpm	(4) 4G-byte WD Enterprise UltraWide SCSI 7,200 rpm	(3) Seagate Barracuda ST34573LW 4G-byte SCSI 7,200 rpm
# and description of HD bays	6 1" hot-swap	8 1" or 6 1.6" hot-swap; 2 fixed full height bays	8 1" hot-swap, 2 fixed	3 hot-swap,1 fixed	4 fixed	4 fixed
Network Interface	Intel 10/100 Pro PCI card	Netelligent 10/100 PCI card	Intel 82557 10/100 on motherboard	Intel 10/100Base-T chipset on motherboard	Intel 82557 10/100 on motherboard	Intel Pro 100+ 10/100 on motherboard
CD-ROM	NEC 12/24X SCSI	Sony CDU571 16X Integrated Drive Electronics (IDE)	NEC 16X bootable SCSI	HP 24X IDE	Plextor PX20Tsi 12/20X variable speed SCSI	NEC CDR-1900A 24X IDE
Availability features	ECC memory Hot-swappable drives	ECC memory Hot-swappable drives Redundant power supplies	ECC memory Hot-swappable drives Redundant power supplies Automatic server reboot	ECC memory Hot-swappable drives Automatic server reboot	ECC memory Automatic server reboot	ECC memory
Manageability features	HP OpenView NNM/SE	Compaq Insight Manager Automatic Server Recovery-2 Integrated Remote Console Integrated Management Display	Remote Diagnostic Manager Advanced Server Manager Pro	Out-of-band management via remote control TopTools server management software	Intel LANDesk Manager Environmental monitor Optional out-of-band server monitor module	Remote shutdown and reboot
Security features	Lockable case and front panel	Power-on password Case and drive locks Keyboard password	Lockable case and front panel	Lockable case and hard drive bay	Power lock	Power lock
Bundled software	HP OpenView NNM/SE	Smart Start Compaq Insight Manager	Remote Diagnostic Manager Advanced Server Manager Pro	TopTools	LANDesk Manager Country Kit CD-ROM	ESMPRO ExpressBuilder
Warranty	1-year on-site parts and labor, years 2 and 3 parts only	3-year on-site, prefailure warranty on hard drives, RAM and processors	3-year on-site next business day	1-year on-site next business day	5-year microprocessor and RAM, 3-year all hardware, 1-year on-site	3-year parts and labor



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Management Strategies

Too much information

Non-IT executives don't appear to be interested in seeing service-level agreements or network performance details.

By Lenny Liebmann

Service-level agreements (SLA) sound like a good idea on paper. As IT departments try to become more responsive to business users, it seems logical to assume that some sort of consistent reporting on availability and performance would give substance to the idea of customer focus. There's just one problem: Users don't care.

Of 17 companies promoting SLA solutions at last month's NetWorld+Interop 98 show in Las Vegas, none could point to an IT department actually using the companies' software to inform business executives about the status of the corporate enterprise. And of 35 organizations interviewed, only two were even close to establishing a periodic reporting system to non-IT managers.

Spare them the details

"Our experience has shown that customers couldn't care less about that kind of reporting," says Susan Sundberg, an account manager with OneSystem Group LLC, which acts as the "in-sourced" IT department for its corporate parent, Kansas City, Mo.-based Farmland Industries, Inc. "All they want to know is whether their system is up and running now. And if it isn't, a report isn't of much interest to them."

Sundberg acknowledges that some reporting is essential to substantiate the value IT is providing. But she says those reports usually are annual. "At the end of the year, you have to show whether you've improved performance or not. And if you haven't, you'd better have a pretty good explanation," she says. "Executives also want to know about things like how much of your budget has gone to supporting existing services as opposed to enhancements."

As a customer account manager with the State of Michigan's Office of Computing and Telecommunications in Lansing, Laurie Taylor is also finding it tough to share network performance data with her contacts in various government agencies.

"We've had SLAs for a while, but they cover how quickly we will respond to requests for changes in service," Taylor says. "The more we've looked at reporting on performance, the more we've realized how difficult it is to define what parameters customers would want us to report on, how often we'd be able to report on them and what kinds of guarantees we want to make about each one."

SLAs are gaining more attention because fundamental changes in the way IT departments are operated are heightening the awareness of customer satisfaction. For example, OneSystem has turned its IT department into an independent profit center. And a massive recentralization program within Michigan's state offices has pulled IT responsibilities out of the individual agencies and in to a theoretically more efficient cross-agency group.

Executive privilege

David Stewart, general manager of information systems at Ernst & Young's regional headquarters in Auckland, New Zealand, says, "Recentralization puts a lot of pressure on IT groups to document how good of a job they're doing. If you're going to take control away from a department, they're going to want you to prove that you're still meeting their needs."

Laurie Taylor says it's difficult to share network performance data with her clients.

JON MURESAN

But IT lacks an understanding of how to quantify those needs. "The IT department needs to report to the business based on the value they're getting from the network," says Stephen Eliot, senior analyst at Business Research Group in Newton, Mass.

"IT is still operating in its historical role of focusing on the technology itself and not on what the various applications and services it provides do for the business," says Eliot.

Until that issue is overcome communications between IT departments and their business constituencies will continue to be rather limited, Eliot says. "There's a lot of education to be done on both sides," he says. "But it's really up to IT to start educating the business side about what it's doing."

The real question, though, is whether business managers will take the time to listen. "If you're running a customer call center, your primary concern is the reality of handling volume on a day-to-day basis," says Gus Estrella, senior network engineer at Fleet Credit Card services in Horsham, Pa.

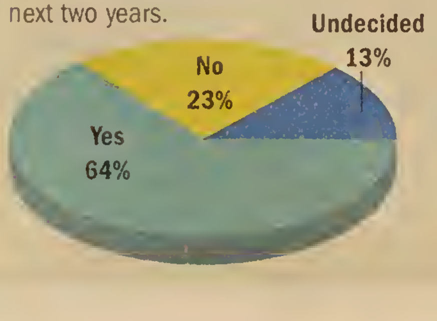
"Users don't want to have to think about the network or performance statistics. They just want it to be there," Estrella says.

Liebmann is a consultant and freelance writer in Highlands, N.J. He can be reached at ll@hiway1.exit109.com.

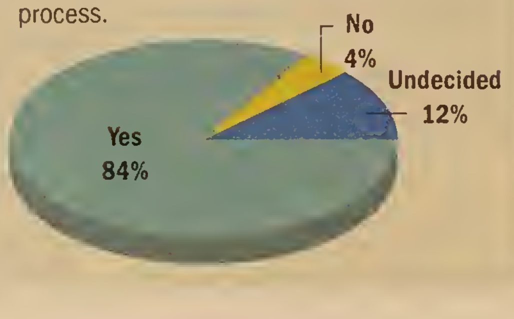
WHAT YOUR COLLEAGUES THINK OF SLAS

Here's what 250 IT managers interviewed by Business Research Group had to say about service-level agreements.

Service-level agreements will be a primary part of our network and systems management strategy in the next two years.



Network and systems management vendors should focus on creating software that can be explained or linked to a business process.



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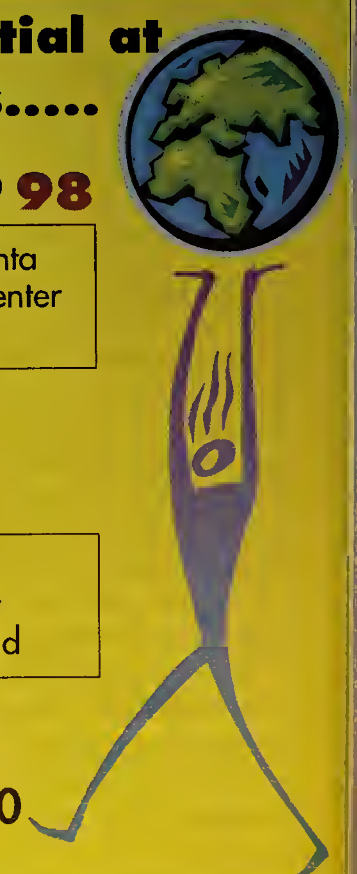

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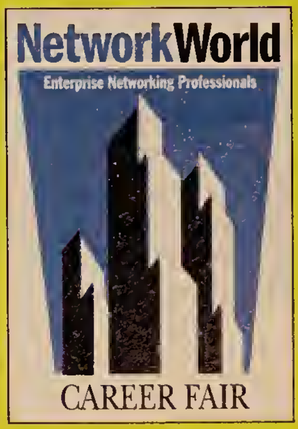

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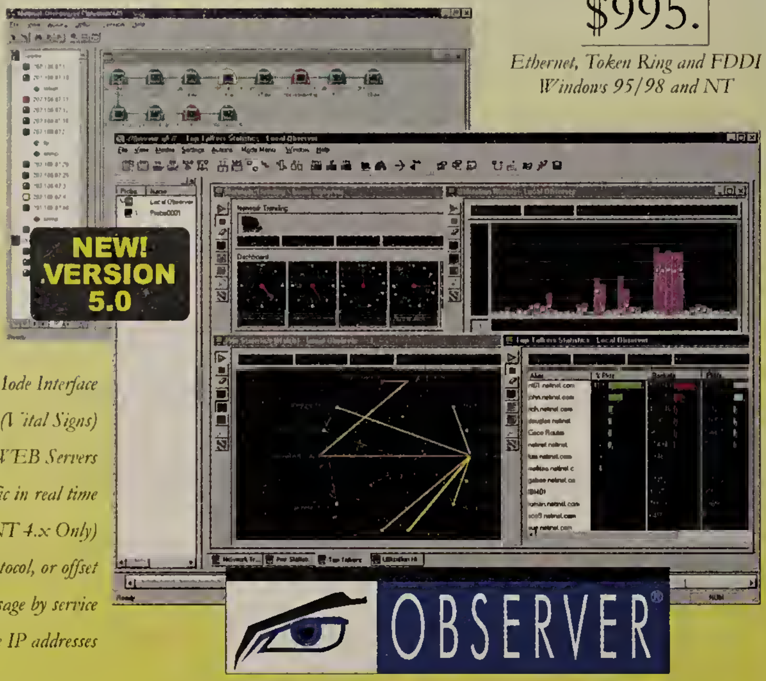

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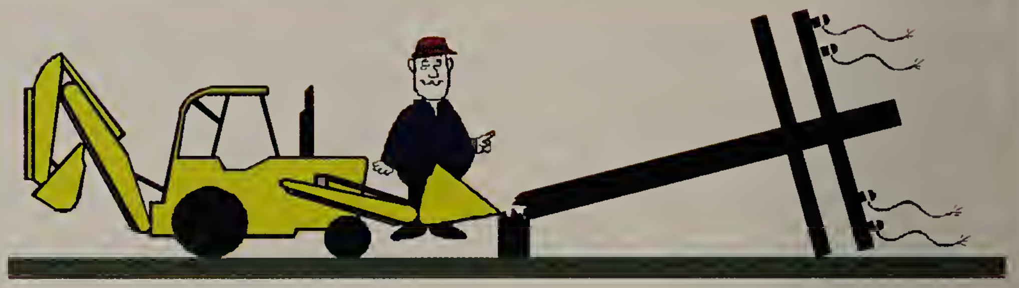

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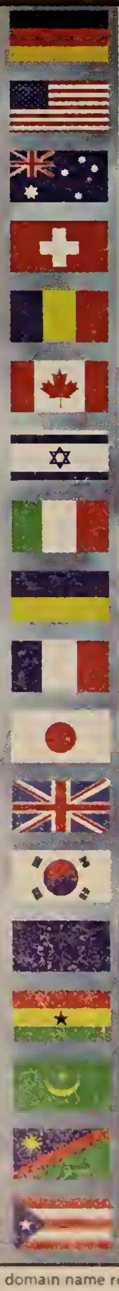

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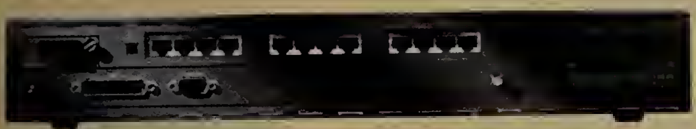

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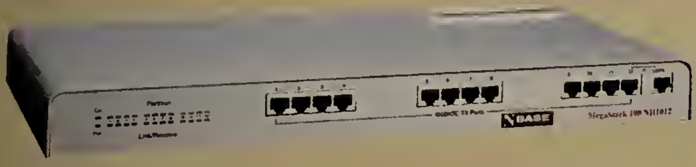

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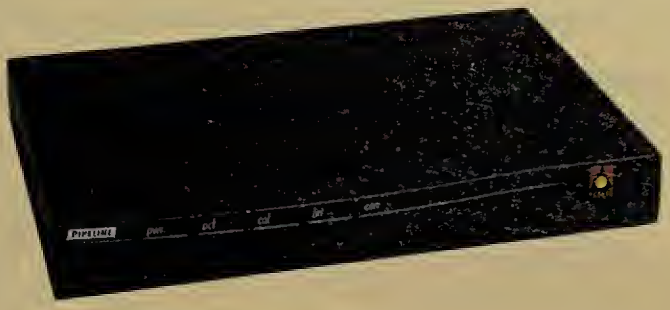

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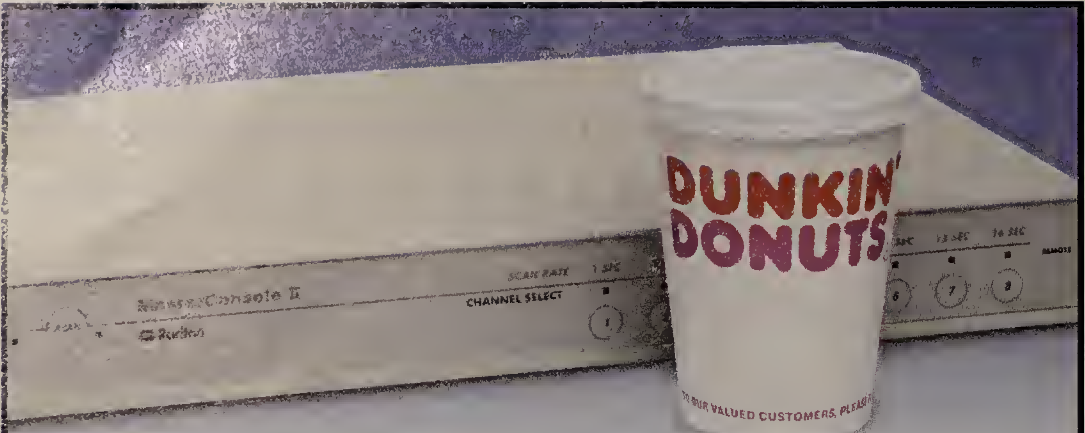

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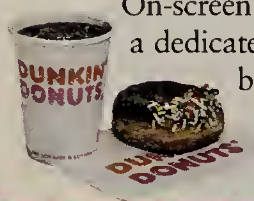

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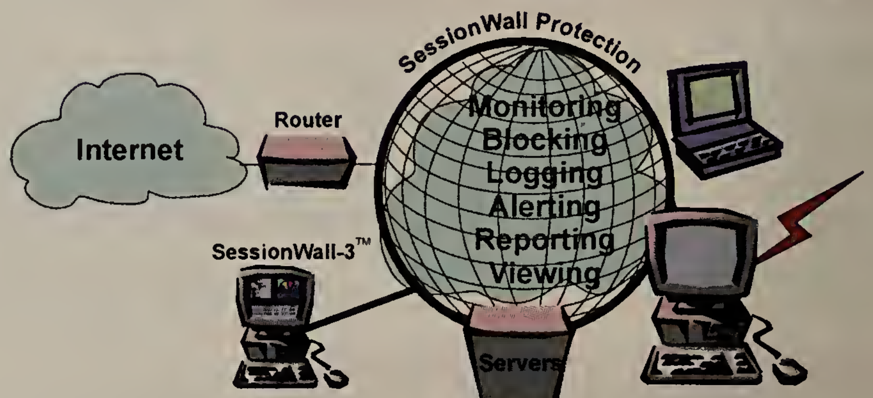

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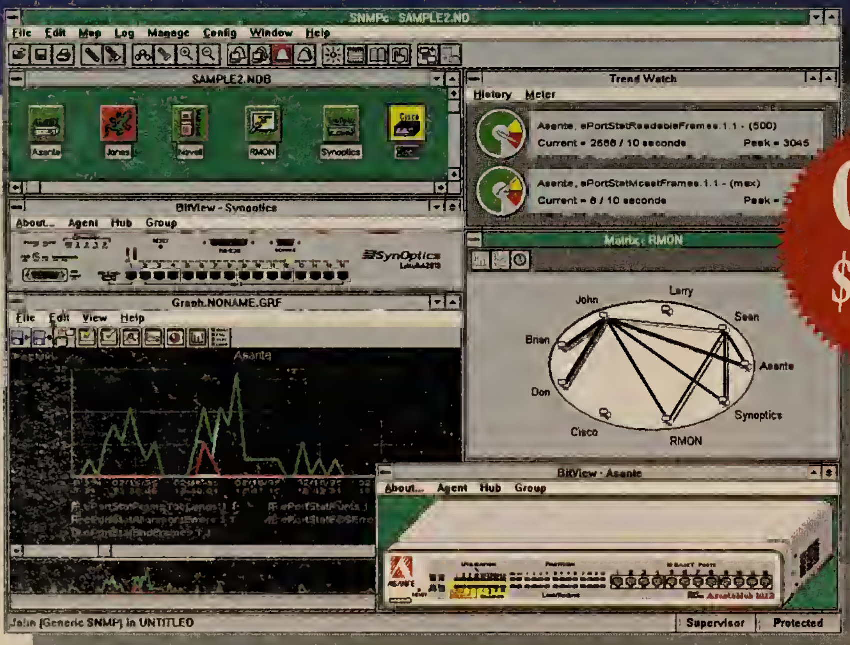

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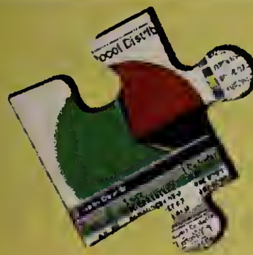

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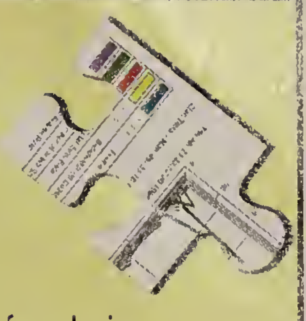

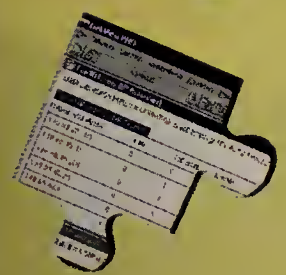

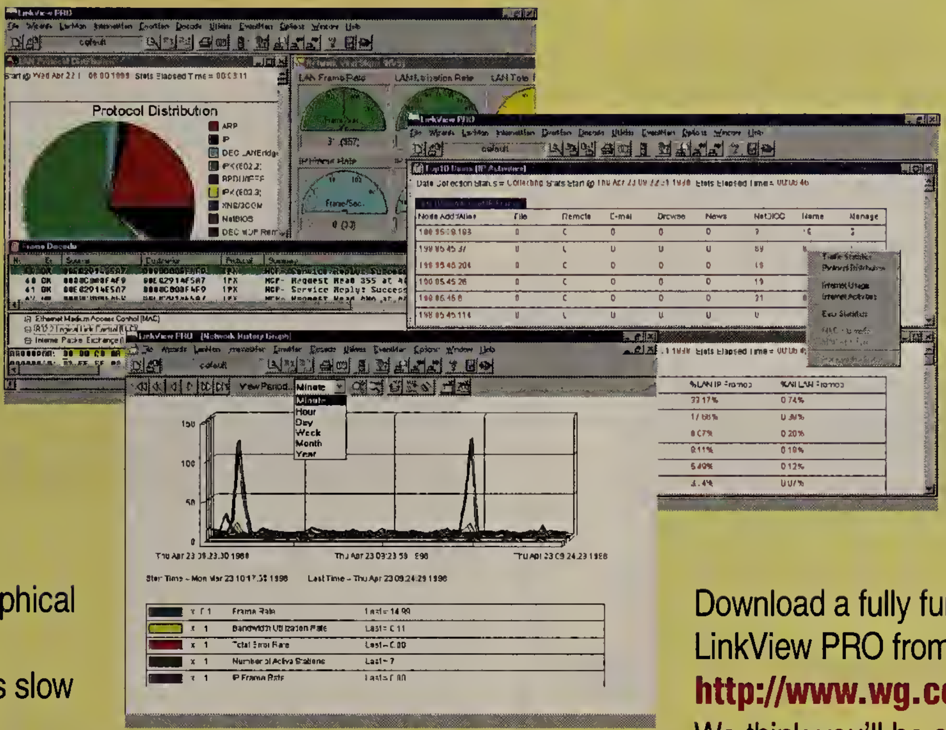

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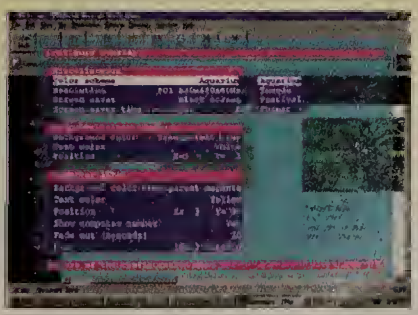

On-screen display menu–This screen shows the overlay menu with the selection for the color scheme popped up.

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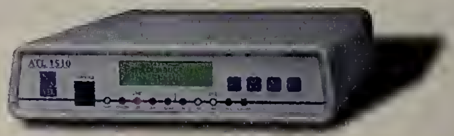

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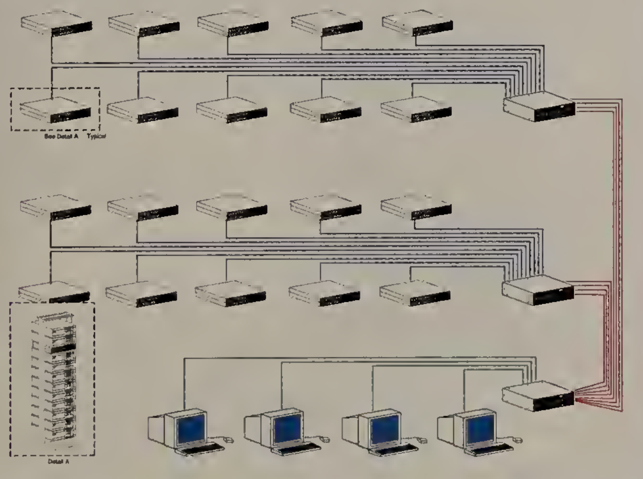

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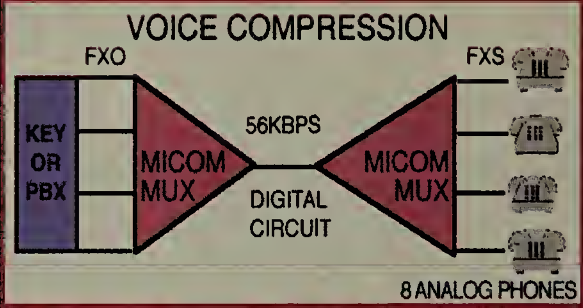

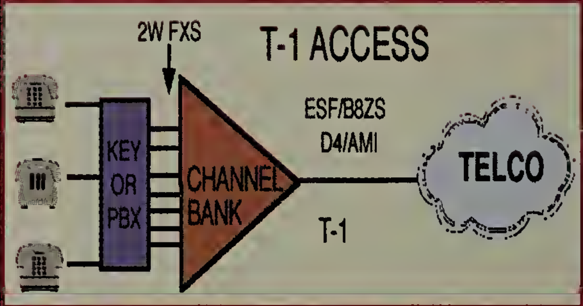

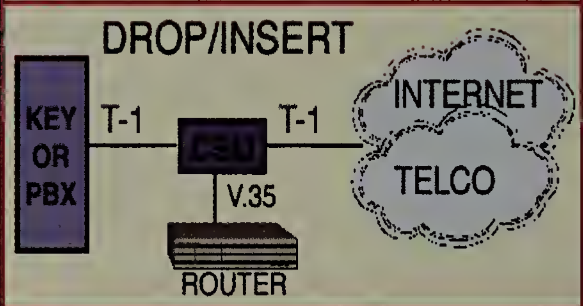

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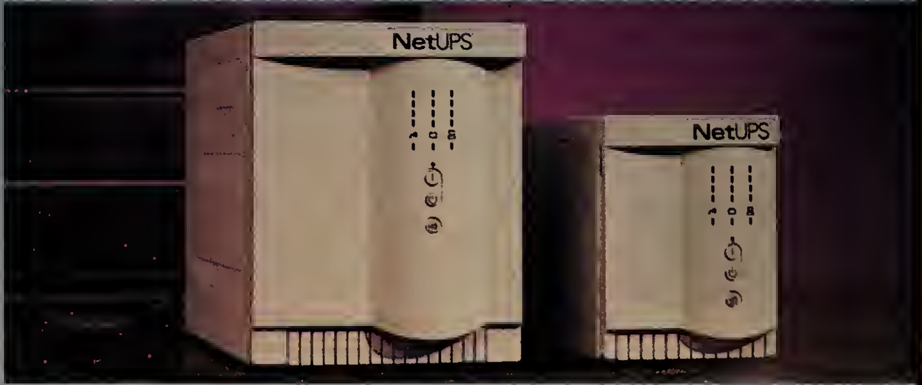

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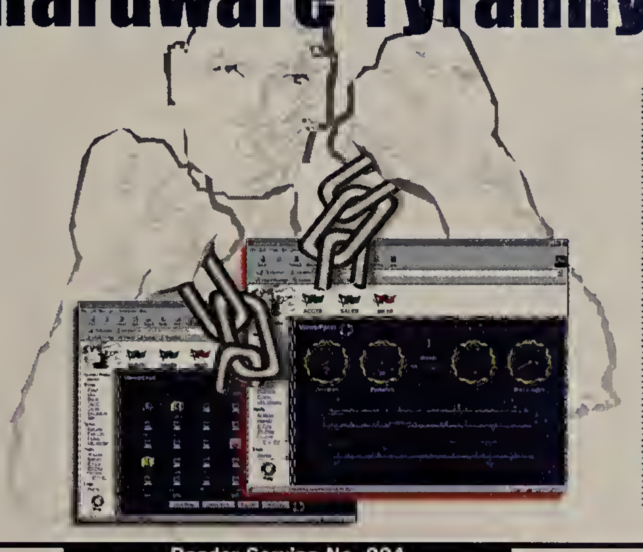

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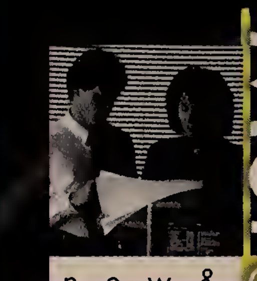

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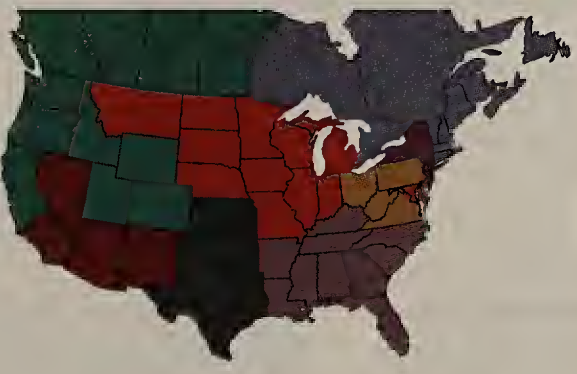

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Universal

Continued from page 1

Advance betting was that the FCC would preserve E-rate but either scale back or extend over 18 months the subsidy payments to school districts for the most controversial part of the program: support for inside wiring and LAN connections. Congressional critics, including the Republican chairmen and ranking Democrats of both houses' telecom oversight committees, have scolded the FCC for including those items instead of just subsidizing Internet access service.

But E-rate defenders — including FCC Chairman William Kennard, the National Education Association and President Clinton — have blamed AT&T and MCI Communications Corp. for passing on their universal service subsidy costs to residential users. And the FCC's expected action was considered unlikely to stop impending rate increases for business users.

For example, MCI plans to hike its universal service surcharge for large businesses' interstate voice and data traffic from 4.4% to 4.9% on July 1, bringing it up to levels originally set by AT&T and Sprint Corp. for business users.

All this has led to a growing chorus of demands to scrap the universal service system entirely and start over.

"We believe it is too late for the commission to rescue itself merely by tinkering with a fundamentally flawed and legally suspect program," wrote the four congressional critics to the FCC, led by Senate Commerce Committee Chairman John McCain (R-Ariz.). "Instead, it is time for you and your colleagues to put the mistakes of the [past] behind you and start anew."

The crux of the current brouhaha began in May 1997 when the FCC voted in E-rate. The vote followed Clinton's call to put Internet access in all classrooms across the nation by the year 2000.

The way E-rate works is school districts post a competitive bid on a Web site operated by the Schools and Libraries Corp. (SLC), a corporation established by the FCC to run the program. The SLC has drawn criticism for its lavish salaries.

Whoever wins the bid — a carrier, distributor or value-added reseller that has put together the necessary pieces — then sells the eligible services for 20% to 90% off their regular prices. The higher discounts apply to poorer school districts, usually measured by the percentage of student's eligible for the government's subsidized school lunch program.

Even so, school districts in wealthier areas have been among the first to apply, requesting discounts for sophisticated services such as ATM to the desktop and Switched Multimegabit Data Service to concentrate Internet access traffic.

Numerous academic authorities say the program is out of control and should be junked entirely.

"The plan is stupid because it's subsidizing Chevy Chase, Md., and Greenwich, Conn., as well as the inner cities," said Jerry Hausman, a professor of economics at the Massachusetts Institute of Technology. "Universal service was never meant to subsidize places where the average price of a house is $800,000."

Rather than a true subsidy program, the entire universal service system "is just a bunch of lawyers with their hands in the cookie jar," Hausman said. He estimated that for every dollar raised to pay for Internet access at schools, an additional $1.05 to $1.25 must be raised for the SLC to administer the program.

"I would advocate that universal service just go away tomorrow," said Kent Lassman, a telecommunications policy analyst at Citizens for a Sound Economy Foundation, a Washington, D.C. think tank. But since that's not "politically viable," the FCC should stop blaming Congress just for adding schools and libraries to the list of universal service recipients, he said.

"The act certainly didn't say anything about inside wiring or training," Lassman said. "[The FCC] could have decided that we'll send every school $20 a month for [America Online] and one computer," he added.

But who's to blame?

The controversy was muted until AT&T three weeks ago filed a tariff to impose a universal service surcharge of 5.0% on residential phone calls. Kennard immediately fired off an unusual public statement criticizing AT&T's action, saying the fees to support universal service are meant to be paid by carriers, not users. Besides, Kennard added, other FCC actions have saved AT&T money in fees they must pay local carriers to complete phone calls. His statement created a firestorm of criticism from members of Congress and even another FCC commissioner claiming that no matter how you cut it, the money to fund E-rate is a "hidden tax" that AT&T has every right to pass along.

"The government shouldn't tell businesses how to write a bill," Lassman said. "It doesn't hold water for the government to impose the fee and then think they're not going to pass it along. There's really nowhere else for it to go."

Privately, some users agree. "These extra charges are getting tiring," said one telecommunications manager outside the education field who asked not to be identified. "But the FCC is awfully naive if they thought the carriers wouldn't pass [the charges] along. They always do."

He cited other new surcharges on 800 calls from pay phones — made up by a surcharge on those calls and a general increase in 800 rates — as well as a new fee due next year to repay regional Bell operating companies for setting up local telephone number portability.

Even some network professionals at schools came to the defense of both AT&T and MCI, the two carriers that so far have said they will impose a residential universal service fee.

"To me, the E-rate is like a sales tax that's added to communications services," said Steve Finch, a former school-district network manager who is now principal of Finch & Co., a Kansas City, Kan.-based firm that holds network management contracts with schools. "I think that anyone who thinks otherwise is being naive about it."

Deidra Massenberg, editorial assistant in Network World's *Washington, D.C. bureau, contributed to this article.*

A NUCLEAR WAR OF WORDS FROM THE POLITICOS

President Clinton, at MIT:

"E-rate is the most crucial initiative we've launched to help connect our schools to the Internet."

Sen. John McCain (R-Ariz.), to FCC Chairman William Kennard:

"The commission's efforts to implement the universal service provisions of the Telecommunications Act of 1996 have been a spectacular failure and a raw deal for consumers. The commission should immediately suspend further collection of funding for its schools and libraries program."

House Speaker Newt Gingrich (R-Ga.), at the Supercomm trade show:

"It is wrong for five unelected, appointed commissioners to be able to establish a tax on every telephone line in the U.S."

Users to carriers: Let's make a deal?

While carriers are tightening the noose around universal service charges, some users, reportedly including major federal agencies, have been simply refusing to pay the additional fee, claiming the fee violates their contracts.

But carriers are making sure the wording of any new or renewed contracts makes it clear they can levy the fees.

Case in point: AT&T's Tariff 12 — an old, comprehensive voice and data contract that now covers about 150 users. The original wording of Tariff 12 prevents AT&T from levying this kind of fee in the middle of a contract term. But as individual users' Tariff 12 contracts expire, if the user renews for another term AT&T rewrites the contract to include the fee, said Ellen Block, a Washington, D.C. attorney who negotiates user contracts.

In the case of MCI Communications Corp., it has no official exception to charging the fees. MCI officials said they understand why they got a lot of grief when the carrier imposed its new fees on users earlier this year. "Their telecom budgets are locked down by the end of the third quarter or the fourth quarter," said Ron McMurtrie, vice president of product management for MCI's Business Markets Division.

But McMurtrie implied that users may be able to make up the difference in new contracts via the rates they pay for voice and data services. The reason: Local carriers reduce the "access fees" they charge long-distance carriers every July 1, per federal regulations. Knowledge of such future reductions could help users when they negotiate a two- or three-year contract.

One tack when negotiating a new contract is to calculate your expected universal service charge and ask for reduced rates in services such as 800 and frame relay to make up for it, Block said. The big three carriers are all charging 4.9% for large businesses.

But don't expect carriers to write a credit against the exact amount of the surcharge, she added. "That's a little transparent in terms of signaling other customers," Block said. "If the carrier wants to [write credit] for some people and not for other people, they have to be discreet about it."

— David Rohde

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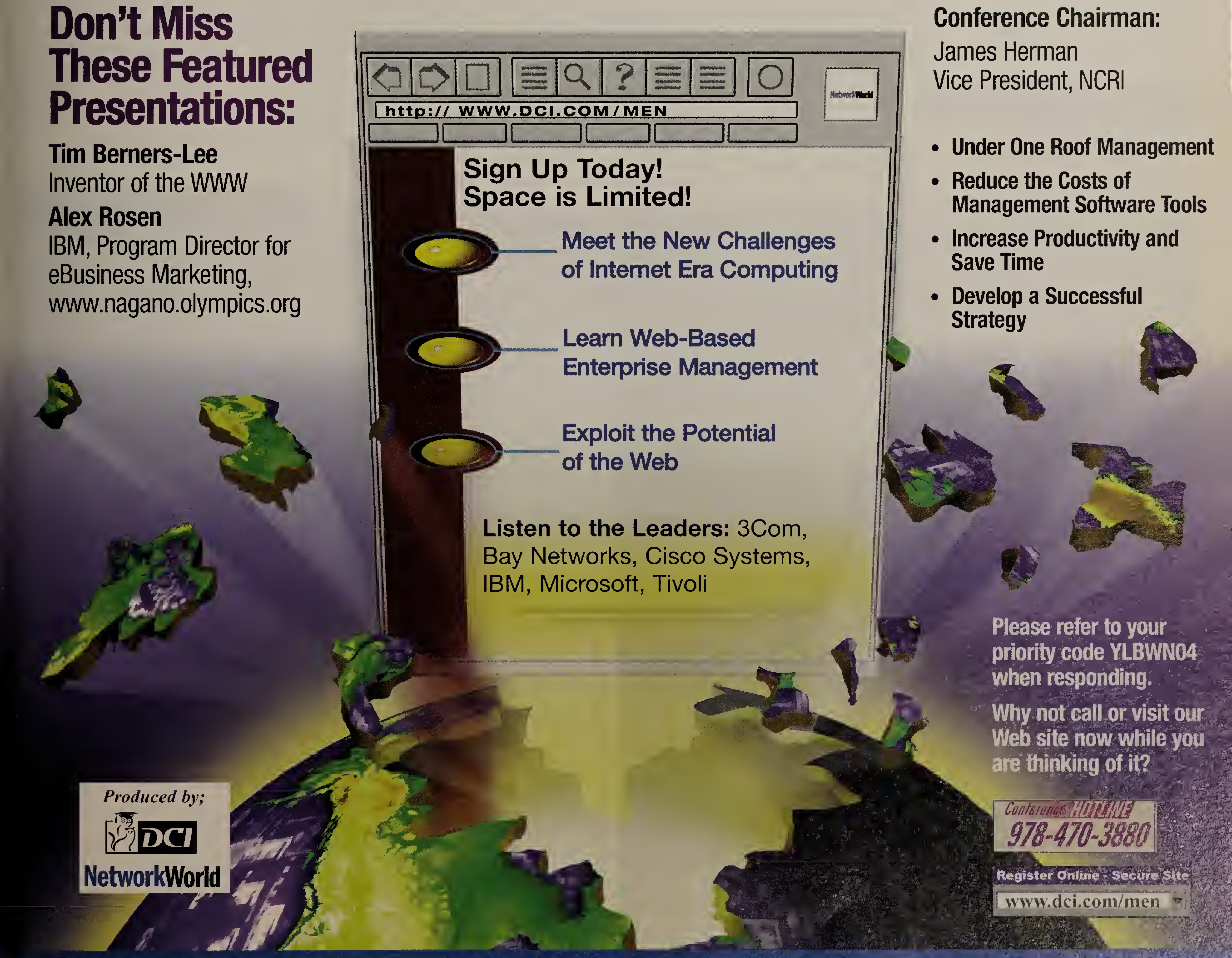

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In-box

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believes overall e-mail usage is near peaking. By the year 2000, according to an Electronic Messaging Association research project, the number of e-mail users will have grown by 33%, and total messages will be up almost 75% (see graphic, right).

"It certainly puts a lot of pressure on network administrators and messaging systems administrators," said Stephen Layne, vice president of messaging at Lotus Development Corp. "You really have to establish acceptable use policies within your organization; otherwise you're going to wind up getting yourself in trouble."

Aside from message storage and bandwidth consumption concerns, there is the more basic matter of individual employees being buried under more e-mail than they can possibly read. Crocker has discussed the issue with fellow power users (he gets 300-plus per day) and other experts.

"They seem to believe that the maximum they can possibly process in a day is about 200 of those [messages]," Crocker said. "And, I would predict that on a day like that you don't get anything else done."

Layne said he receives about 200 e-mail messages daily. He has written a filtering macro that feeds them in to a Lotus Notes database that allows him to mine for the important stuff using full-text searches. However, that approach by no means allows him to read every message.

"As a heavy e-mail user, you have to be pretty quick and pretty liberal with the delete key," Layne said.

While spam rightfully gets much of the blame for in-box glut, the increasingly popular e-mail subscriber lists from media outlets, professional organizations and vendors are causing much of the overload.

"I get more e-mail list server traffic than junk mail," said Tom Connors, a senior member of the technical staff at Texas Instruments, Inc. in Attleboro, Mass. "Most of my problem is my own making."

In addition, inconsiderate e-mail users — such as the glory hounds who Cc: everyone every time they issue a memo — contribute greatly to the overload. "Who sends a paper memo and copies 300 people?" asked Gary Rowe, a consultant with Rapport Communications. "People do that with e-mail."

What you can do about e-mail overload...

...As a network manager

- Draft, distribute and enforce acceptable use policies.
- Consider limiting the maximum size of end user in-boxes.
- Make shared filters part of standard desktop configurations.
- Encourage use of shared folders for fun stuff – joke lists, video clips, etc. – that otherwise clutter in-boxes.

...As an end-user

- Filter messages with your name in the "to:" field to a "must read" folder; "Cc:s" to "when time permits."
- Exploit template and automatic response features.
- Copy only those who need to know.
- Don't send large files to remote recipients who are using slow, expensive connections.
- Make subject lines meaningful.
- Keep messages short.

The filtering and sorting capabilities of e-mail clients such as Microsoft Corp.'s Outlook, Lotus Notes and Eudora Pro from Qualcomm, Inc. have matured considerably in recent releases. Outlook, for example, allows e-mail to be color-coded by sender; say red for the boss, blue for key customers and green for friends.

Usage policies are a vital tool for keeping e-mail volumes under control, experts say, but they are not a panacea.

"We do limit student e-mail storage to 10M bytes, [which] forces [the students] to keep their mailboxes under control," said Greg Scott, IS manager for the College of Business at Oregon State University. "Student chain letters are a problem. We have policies that prohibit them, but the students still send them."

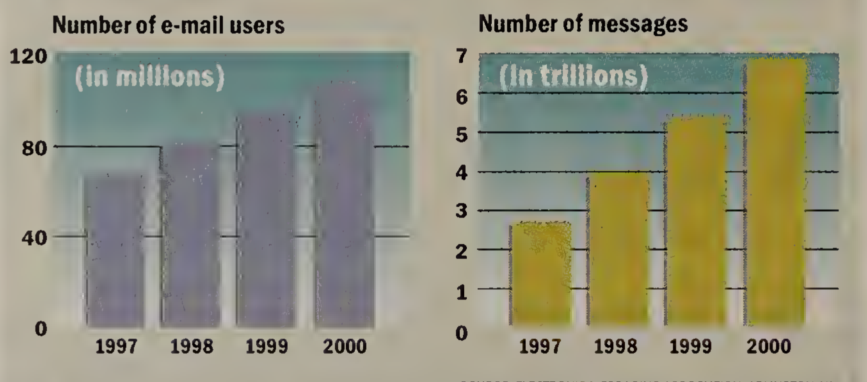
Mass circulation of video clips and joke lists also contribute to the e-mail clutter, according to Alky Poulias, a LAN administrator at xpedx, a division of International Paper Co. in Covington, Ky. Rather than try to ban the practice, Poulias tried a different approach.

"Instead of being heavy handed and forcing it underground, I set up a Notes document database the users can access that serves as a repository for the files," Poulias said. "So instead of that 15M-byte AVI of the Taco Bell Dog wasting space in 20-plus user mail files . . . it's now virus-checked and contained in one specific place."

Despite the e-mail glut problems, there is optimism among e-mail experts that new solutions — both technological and behavioral — will keep pace with higher e-mail volumes.

"There's going to be a point where culture and common sense are going to start to take over," Rowe said, "because there's only so much of this we can process." ■

E-MAIL'S BIG PICTURE



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DSL

Continued from page 1

public relations, part education, part self-enhancement and part improvement for the end user, which is what I am interested in," said Virginia Brooks, an analyst with Aberdeen Group, Inc. in Boston. More than 10 DSL flavors exist based on technology so fundamentally different they could never interoperate. The best users can hope for is interoperability within each flavor.

SUPERCOMM '98

However, compatibility within each flavor may also be elusive. Rather than setting up a single test bed where any vendor could try to sync its gear with anyone else's, modem makers are selecting their own group of partners for compatibility testing, creating an incomplete compatibility effort.

3Com Corp. led the parade by announcing a list of other companies with which it would establish interoperability, and other vendors followed (see graphic).

Clearing up the compatibility issue is important to customers. They want to buy DSL modems today with some assurance that they won't have to throw them away tomorrow if they choose a new service provider that uses hardware from another vendor.

Standards problems may also stand in DSL's way. The most talked about DSL flavor, asymmetric DSL (ADSL) can be supported by either of two underlying coding schemes. One of those forms has a standard, but it is under revision.

Many ADSL vendors are promising to meet that so-called G.DMT standard when it is set sometime later this year. In the meantime, though, vendors are seeking interoperability based on prestandard technology.

A similar problem faces a lower speed, easier-to-install version of ADSL commonly called ADSL Lite. The official standards body — the International Telecommunication Union (ITU) — is working on a standard, as is an unofficial outside group called the Universal ADSL Working Group (UAWG).

The UAWG, headed by Microsoft Corp., Intel Corp., Compaq Computer Corp. and the regional Bell operating companies, is sharing its work with the ITU, but the UAWG expects to finish first.

Vendors intent on cornering the market plan to make modems based on the UAWG proposal as soon as it is ready. They say they will ultimately adopt the ITU standard and upgrade their non-standard modems with software downloads.

Vendors of customer modems naturally want compatibility between their gear and carrier-end modems. If they don't work together, nobody will buy them. "It is required that the [customer modems] are interoperable with carrier platforms," said Laura Howard, vice president of marketing and business development for 3Com's DSL group.

3Com, which makes customer-end ADSL modems, is pursuing interoperability with what it considers the biggest names in the carrier end of the ADSL game. Other vendors are pursuing a similar strategy.

The ideal for end users would be if DSL modems from any vendor worked reliably with other DSL modems of the same flavor, just as analog modems do today, Brooks said.

Because standards are still in the making, vendors are stuck trying to sell modems now as best they can and are working toward meeting standards as they are formalized. "We want to use the standard today, but we also want to make money today," said John Reister, director of product marketing for Copper Mountain Networks, Inc., a DSL modem vendor. ■

DSL buddies

Vendors are being selective in finding DSL interoperability test partners.

Company	Interoperability test partner(s)	Test focus
3Com	Advanced Fibre Communications, Redback Networks, Alcatel, Diamond Lane, Lucent, Newbridge	ADSL hardware
Cisco	Alcatel	ADSL hardware
Copper Mountain	Netopia	Symmetric DSL hardware
Efficient Networks	Newbridge	ADSL hardware
Lucent	Analog Devices	ADSL chips
Westell	Adtran	High-bit-rate DSL hardware

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IBM's Global Services boosts bandwidth

Strategy revolves around "bonding" analog or ISDN connections to double, triple or quadruple access speeds.

By Denise Pappalardo
New York

IBM Global Services this week will give its dial-up service customers a bandwidth boost.

At PC Expo, IBM is expected to announce a new feature that will let customers bundle or bond up to four ISDN channels, or up to four analog lines, to speed up access to the 'Net or their corporate networks.

The service is aimed at branch office users who need high-bandwidth connectivity but not enough to warrant a dedicated link.

At first glance, the service looks as if it would be more economical than a dedicated service, but only if users just want bursts of high-bandwidth connectivity. For instance, if users wanted to keep their bundled ISDN Internet Connection Services plugged in for an entire 40-hour workweek, they would pay $1,120 per month for 256K bit/sec worth of bandwidth. PSINet, Inc. offers its users a dedicated 256K bit/sec frame relay Internet access connection for $895 per month.

Service is Aces?

Ace Hardware Corp., an IBM customer for 10 years, has negotiated unlimited Internet access for its 3,200 retail stores and believes that some of its outlets will be interested in beefing up their dial-up bandwidth, said Frank Murphy, electronic services manager at Ace in Oakbrook, Ill.

About 1,000 of Ace's retail stores are now on IBM Global Service's Internet backbone, and the remaining will be migrated over from IBM's remote access network within the next two years.

"There are some fairly substantial files that are sent over our network," Murphy said. "An item inquiry for a riding lawn mower will send over a full color JPEG image of the product, and we have some 2,000 line invoices that are 300-byte records."

BANDWIDTH FOR HIRE

IBM Global Services is offering its customers the ability to bond multiple ISDN or multiple analog lines together to boost bandwidth without the cost of going to a dedicated service.

Service	Description	Bandwidth	Hourly rate*
Bundled ISDN	Two bundled ISDN connections	256K bit/sec	$3.50
Bundled Analog	Four bundled analog lines with 56K modems	Approximately 200K bit/sec	$2.50

*Does not include set up fees or local access port or line charges. Volume and length of contract can affect price.

In order to support the new service from IBM, users will need to add the same number of modems as analog telephone lines to their PCs, said Craig Grills, program director at the Somers, N.Y.-based IBM Global Services. But in the case of ISDN, users should be able to find an ISDN access device that supports two ISDN Basic Rate Interface connections.

The feature comes with one additional drawback. In order to support the service, each user's PC should run Windows 98, Grills said. "Windows 98's remote access set-up, and its dial wizard, are much more intuitive than Windows 95, making Windows 98 a much easier fit for this service."

Grills did point out that users can upgrade their Windows 95 dial wizard to support bundling, but this method has not worked as well as PCs running Windows 98, he said.

PSINet, meanwhile, plans to offer bonded 56K bit/sec support this summer that does not require Windows 95 or 98, said Charlie Cary, vice president of product management at the Herndon, Va.-based company. But PSINet's services will require a special hardware device. More details should be available by the end of next quarter.

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IBM

Continued from page 1

port Ethernet hub, Model 8242, priced at $18 per port (see story on Network World Fusion, DocFinder: 7545).

IBM executives said later this year the company would build a new, mid-size, low-cost router to complement its low-end 2210 and high-end 2216 router families. Details from IBM executives were sketchy, but sources said the box will likely support Layer 2/Layer 3 switching, tn3270 server and remote branch office connectivity capabilities.

What's it worth?

IBM wants a big part of major network product revenue. By the year 2000, IBM figures the market will be worth some $69 billion and will break out as follows:

Workgroup products:
- Token ring **$1.1 billion**
- Remote access **$3.8 billion**
- Ethernet **$10.9 billion**

Enterprise legacy products including front-end processors **$34.5 billion**

Carrier and service provider products **$10.6 billion**

Internet infrastructure servers **$7.8 billion**

IBM did confirm that the box will be able to handle IP, SNA and ATM protocols, but that it will not support Gigabit Ethernet.

IBM will also roll out a family of devices dubbed infrastructure servers, said Rob Greenberg, business line manager for NHD's enterprise networks group.

According to Greenberg, these servers will be available in six to eight months and will run a package of software that includes Web caching, IP load balancing, firewall, security and Java application support. IBM will likely bundle this software across all its servers from Windows NT boxes to S/390 mainframes.

By pushing these servers to the edge of their nets for quick downloading of Web pages, users will be able to cut down on traffic congestion in the network backbone and save on bandwidth consumption, said Robert Zimmer, business line manager for NHD's service provider networks group.

Zimmer said his group is involved with a number of future IBM offerings aimed at telcos and ISPs. The service provider networks group is working on a bundled package of IBM's ATM switches and software that it will sell to telcos, which in turn will resell the package as a managed ATM offering.

Similar packages that will enable ISPs and telcos to resell managed voice over frame relay, ATM and IP services are also in the works.

According to Zimmer, users are looking to outsource these types of services, and IBM wants to help service providers offer low-cost services to answer that call. IBM's service provider networks group has inked half a dozen deals for these packages, but Zimmer declined to name the vendor contracts.

For those service providers that want to harness two or more mainframes joined together in a cluster for failover or shared tasks, Zimmer said managed Enterprise Systems Connection (ESCON) service packages will also be available.

ESCON is the fiber technology used to link the mainframes to other big iron or peripheral devices such as storage facilities.

IBM will also sell bundled mainframe and communications hardware/software packages under the auspices of a new service called Netplex.

With Netplex, IBM will sell a S/390 mainframe running TCP/IP bundled with a 2216 router as a TCP/IP package. Ideally, this package would cost less than if users had to buy the hardware separately, but IBM did not reveal pricing for Netplex packages.

"People won't buy [communications products] just because they're IBM's," said Jerry Wetherington, systems coordinator at the University of Florida in Gainesville.

But if the products are priced right, IBM has a shot, he said. ■

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IBM's Haile on acquisitions and NHD's future

Q&A

Donald Haile is one of the shiny blue suits from the golden age of IBM networking. Today, he is vice president of development for IBM's Networking Hardware Division and is part of a team of new executives charged with bringing NHD back to its former glory. Last week, a group of *Network World* editors caught up with Haile to talk about how the battle is going.

IBM is rarely mentioned in the same breath as Cisco Systems, Inc., 3Com Corp., Bay Networks, Inc. and other big network companies. Does that bother you?

We know we have a lot to do. I know we want to be in the lead. I'm tired of reading things where bake-offs happen and it's Cisco and 3Com and Bay or Cabletron. We're as big as at least two of those companies combined and it bugs me that we're kind of out if it. It's also sort of a personal statement. You get behind the eight ball, then you're trying to catch up with the competition.

STEVE BORNS

Your competitors have some aggressive acquisition strategies. What is NHD's acquisition plan?

Acquisitions are funny. We've looked at other companies, talked a lot. I don't think any of us are opposed to that. We're building products fast, but in the case of things like high-end switches or routers it takes a while. There's nobody in IBM saying NHD can't make an acquisition. Take Gigabit Ethernet: I don't think we're ready to make a buy there. We're looking around. There are five companies I could name at the drop of a hat.

We did Tivoli. That was an acquisition of over $100 million. I'd love to see something like that. We're getting a tough, shark-like sales force. It's helped us immensely and caused the rest of our sales force guys to look at Tivoli and see what they're doing. Acquisitions change the corporation. It changes the culture. We were lucky in what we picked up there.

There have been rumors that IBM might spin off NHD as a separate entity. Has there been serious talk within IBM about selling NHD?

Yes. But this is a profitable group . . . very profitable business. It's not as much as we'd like, but it certainly brings in a substantial amount of revenue. Any discussion about NHD going away in the next four months was probably just wishful thinking on the part of our competitors. We have an aggressive plan to roll out new products and services through the year 2000, so we feel pretty rock solid now. We have a huge amount to do to get products out channelwise, but we do not doubt the viability of our products.

One of your tasks when you started this job was to eliminate old products and streamline NHD's offerings. Has that effort been successful?

For a long time we were afraid to cannibalize our own children. I was able to redirect about 10% of our budget to products that promised the most growth. And so we took it out of things that were growing slower. Did I kill a big product to do that? No.

Playing devil's advocate for a moment, why did IBM take so long to go whole-hog in to the Ethernet and TCP/IP worlds?

Token ring was still immensely strong until a couple of years ago. And there's always this hesitancy to eat your children. Sort of like my favorite former manager Ellen Hancock. She wanted one path, and she wanted to go down that one path come hell or high water. It doesn't work that way.

We were doing SNA and all of sudden, [Open Systems Interconnection] came in. I'll bet you we put $100 million in to OSI. I walked in one day, and said, 'I've gotten beaten up enough times, we have to do TCP/ IP.' It's the same thing here. It's like, what will my increased development dollars for TCP/IP and Ethernet do to my SNA? Well guess what, TCP/IP's going to happen whether we go in the other direction or not. People say we're SNA forever, but that's just not the case now.

This time as we roll out Ethernet products, I think, channels, channels, channels. We're building this stuff and you got to get it out in the field. You've got to get it out to your customers. We're going to turn it pretty fast. One of things will be Gigabit Ethernet. We know we have to do it. We're working hard to get it done.

— Marc Songini, John Gallant and Michael Cooney

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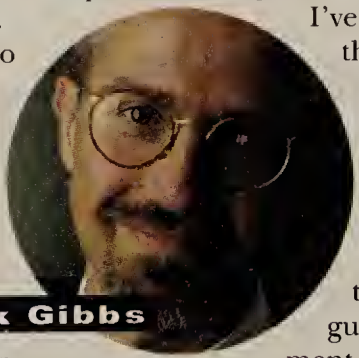
Backspin

FTC: Thanks, but no thanks

It only took me six months to get around to updating the Gibbs Institute Web site (www.gibbs.com), but now it's finally online.

While I'm reasonably pleased with the site, some of the really fun stuff I plan to put on it will have to wait until I can get my new server up to Silicon Beach, my ISP.



One of my plans is to provide registration so users can subscribe to lists and services. And along with that I should publish my privacy policy defining what I will do with the private information of those who register.

Online privacy is becoming a big issue. On June 4, the Federal Trade Commission (FTC) released "Privacy Online: A Report to Congress" (you can find the press release at www.ftc.gov/opa/9806/privacy2.htm and the report itself at www.ftc.gov/reports/privacy3/toc. htm).

The FTC has been working on the problem of consumer protection for many years and has had much success. That said, its successes are small when you look at the sheer scale of the problem. Just consider the appalling inaccuracies of the credit reporting bureaus. They are highly visible and repeatedly make the most egregious mistakes, yet they don't really get the punishment they deserve. Big money talks, folks.

So it is with some cynicism that I view the drum banging of the FTC on the subject of Internet privacy practices. For example, its report states that around 85% of Web sites collect personal information, while only 2% provide consumers with a comprehensive privacy policy. Only 14% notify consumers that their information is being collected.

So? Let's consider the real world: How many companies that swipe your credit card have their privacy policies posted? How many have a privacy policy that has made it further than a directive from the board to senior management? The answer to both is damn close to zero.

And consider one of the trends that has gone largely unnoticed: Signature capture. In a significant number of retail operations these little pads have been appearing that digitize your signature as you sign the credit slip.

Have you ever wondered what happens to that data? I have. And I've often asked tellers if they know. Their response is always "no." I can imagine the pads might be used to "intelligently" determine if the signature you make is that which is authorized for the card, but that's a guess. There's no statement I've seen that explains the whys and wheres of the thing.

I could go on at length about these and other privacy issues that don't involve the online world, but let's cut to the chase. Given that privacy concerns apply daily to the lives of 300 million people in America, while Internet privacy concerns no more than perhaps one sixth of those same people, isn't that indicative of a somewhat skewed set of priorities?

Once again it's the bureaucrats and politicians quixotically tilting at the windmills of technology. It is that old mountain climbing thing: They do it because it's there.

The Internet is an easy target. It's new, it's partially understood, and it is far sexier than trying to bring Equifax into line (which could give any government lackey who tries it a whole heap of trouble).

Once I start collecting personal information on my Web site I'll add a privacy policy. I'd advise you to do the same on your site. Until the fossils who run the FTC and, for that matter, the government in general, are replaced by people who understand electronic commerce, we need to keep them off our backs and out of our pockets.

Then for want of targets, perhaps they'll focus on real issues in the real world.

Rage against the machine to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.

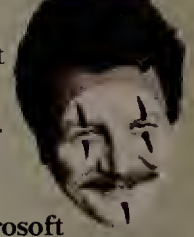
'NET BUZZ

The latest on the Internet/intranet industry

By Chris Nerney

YOU WOULDN'T BE SO IMPETUOUS IF SCOTT WERE HERE Industry pundit and venture capitalist **Stewart Alsop** last week entered the heart of Java Nation to dispense some blunt words of wisdom to a group of analysts and media assembled for **Sun's** third Inside Sun Software day.

Alsop, a longtime trade publication editor and now a partner with the venture firm **New Enterprise Associates,** opened his keynote address at Sun's Palo Alto, Calif. headquarters by observing that "venture capitalists don't know anything because they're so busy working with their companies."



Further heightening anticipation, Alsop next warned that he had thrown together his slide show at 4 a.m.

Geez, Stewart, nothing like raising audience expectations. We've seen mimes warm up a crowd better than that.

Fortunately, Alsop went on to say a few interesting things. First, he praised Sun's Solaris servers and predicted that "**Microsoft** is finally going to have some bad news with Windows 98."

Then he took some swipes at subjects near to the hearts of his hosts.

"NCs are dead," Alsop declared, proving that venture capitalists actually do know something.

This statement sparked a pro forma protest by Solaris division **President John McFarlane,** who was left to defend Sun's honor due to the absence of **Scott McNealy.** The Sun CEO was scheduled to be at the event, but reportedly was "held over" in Washington, D.C., no doubt to cheer on the **Federal Trade Commission** for suing Solaris partner **Intel.**

Alsop followed his network computer jab with another one: "Web surfing sucks on consumer devices."

By this time, Sun officials probably wished they *had* booked a mime.

ALL ALSOP, ALL THE TIME Internet applications vendor **2Bridge Software** has pulled down $10.1 million in second-round venture funding from **New Enterprise Associates, Goldman Sachs** and several private investors.

2Bridge, based in San Francisco, sells an "out of the box" browser-based server application designed to allow real-time enterprise publishing and information management. The vendor is targeting companies building intranets.

And sitting on the company's board is none other than that tart-tongued master of ubiquity, **Stewart Alsop.**

NEWS YOU CAN USE Usenet service provider **Supernews** says it will get $4 million in venture funding from **Benchmark Capital.**

Based in San Jose, Calif., Supernews outsources newsgroup services to corporations, ISPs and individual clients. The venture deal represents the company's first round of funding.

The start-up also has added former **Netscape** chief technology officer (CTO) **Eric Hahn** to its board of directors.

Hahn joined Netscape in 1995 after the browser vendor purchased **Collabra Software,** the company he founded.

His tenure as CTO was relatively brief — he was appointed last October to succeed **Marc Andreessen,** but left this spring.

Netscape told *'Net Buzz* sources that Hahn wanted to spend more time with his family and pursue investments in other growing businesses.

ROWECOM GRABS $8 MILLION Business-to-business electronic commerce software vendor **RoweCom, Inc.** of Cambridge, Mass. has closed an $8 million second-round venture deal with several investors.

RoweCom's software allows workers in large corporations to access and order periodicals, journals and books, and lets administrators manage large orders. Customers include financial and professional services firms, high-tech companies, health care organizations, and academic and public institutions.

Highland Capital Partners, Crystal Internet Venture Fund and **Working Ventures Canadian Fund** participated in the round.

Got a good Internet or intranet tip to share? Send it along to Chris Nerney at (508) 820-7451 or cnerney@nww.com. That means you, too, Stewart.

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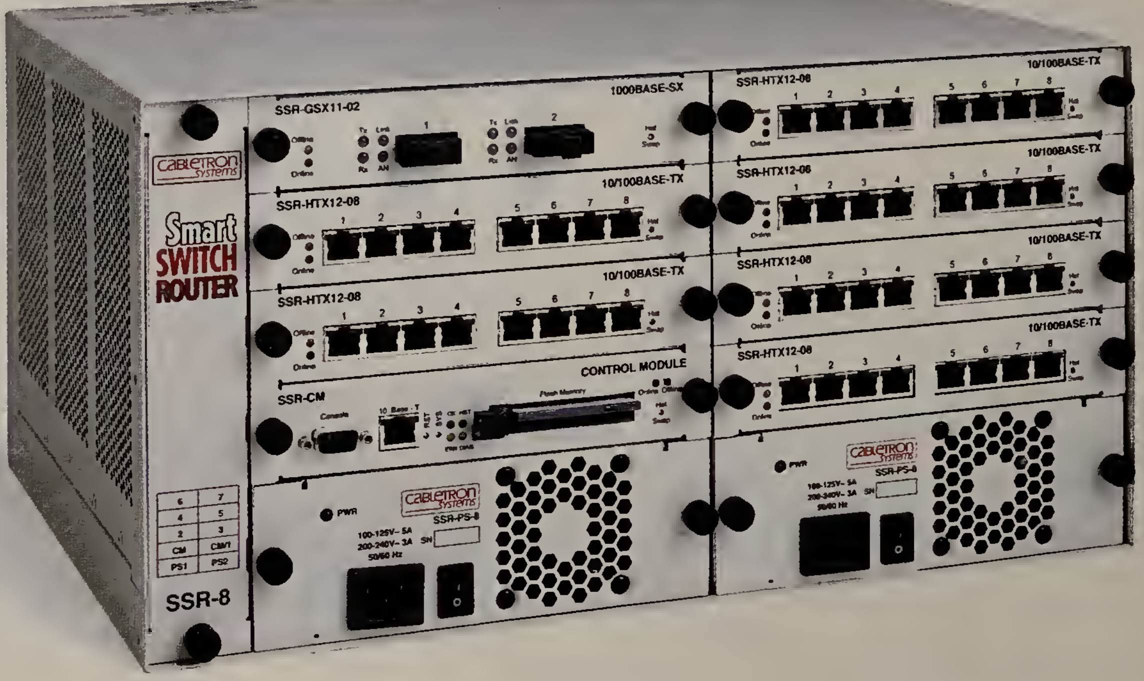

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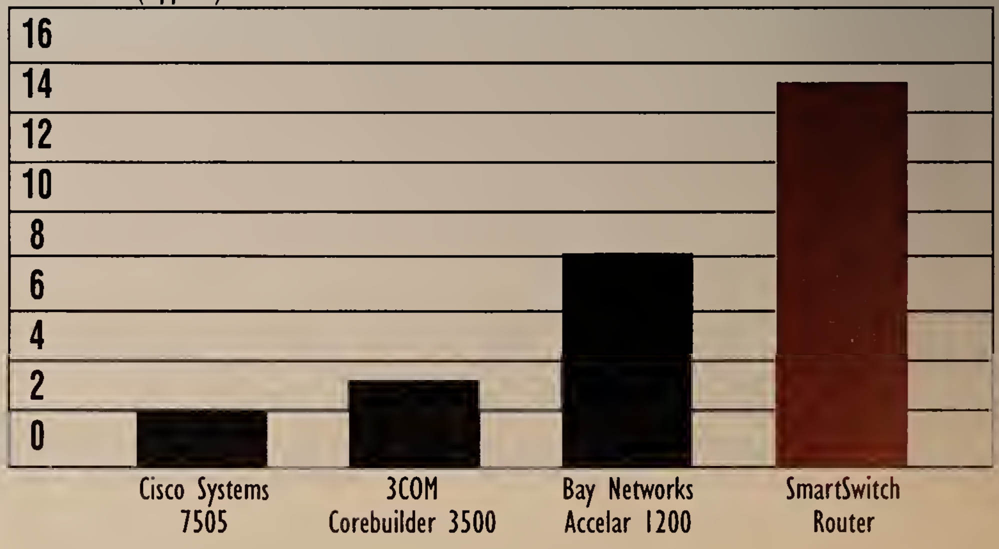

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